

**FIG. 1**

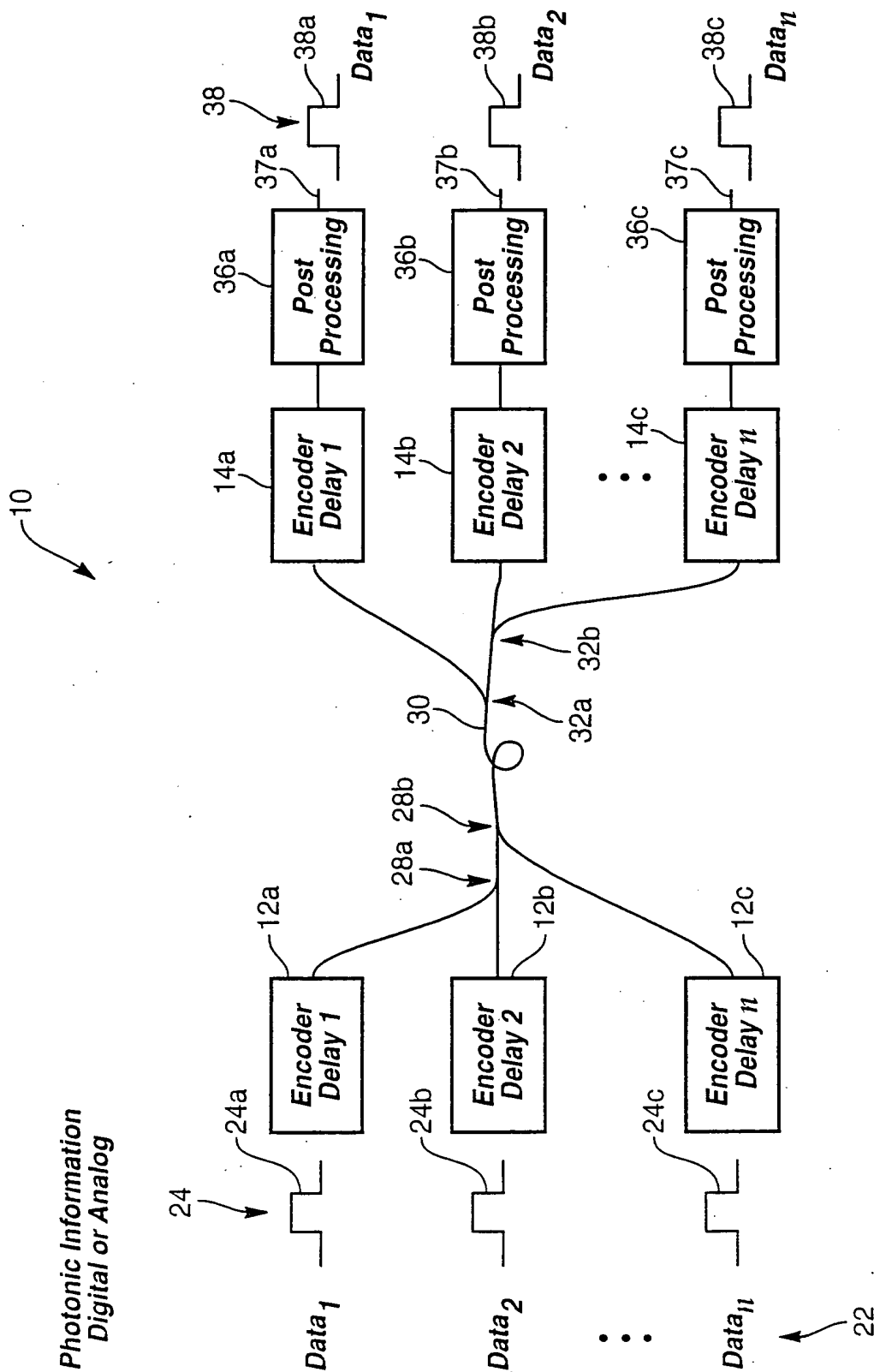
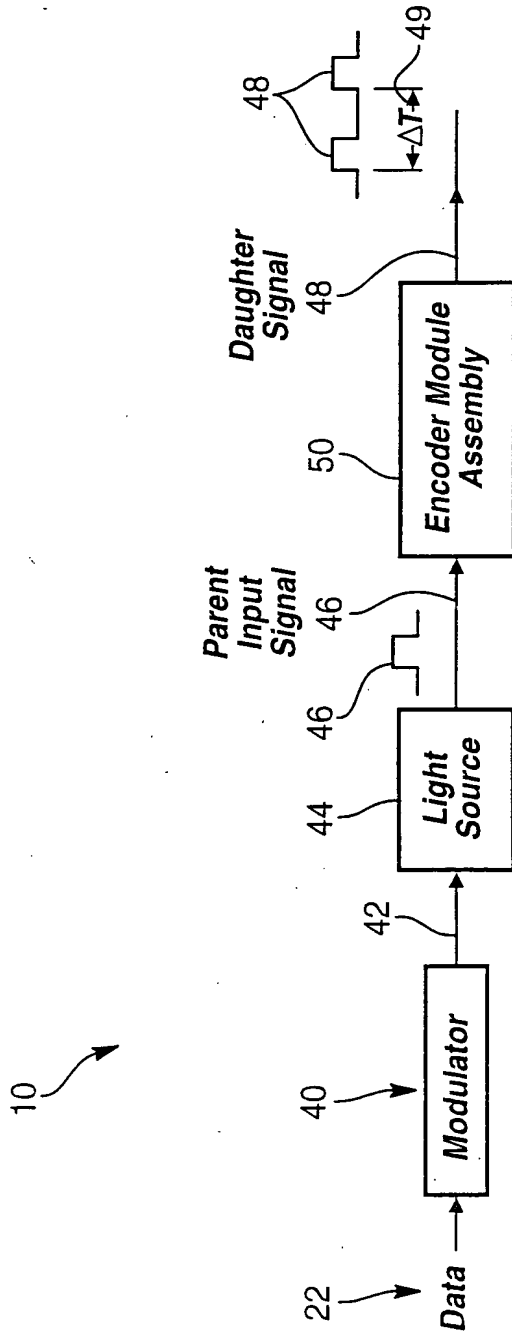
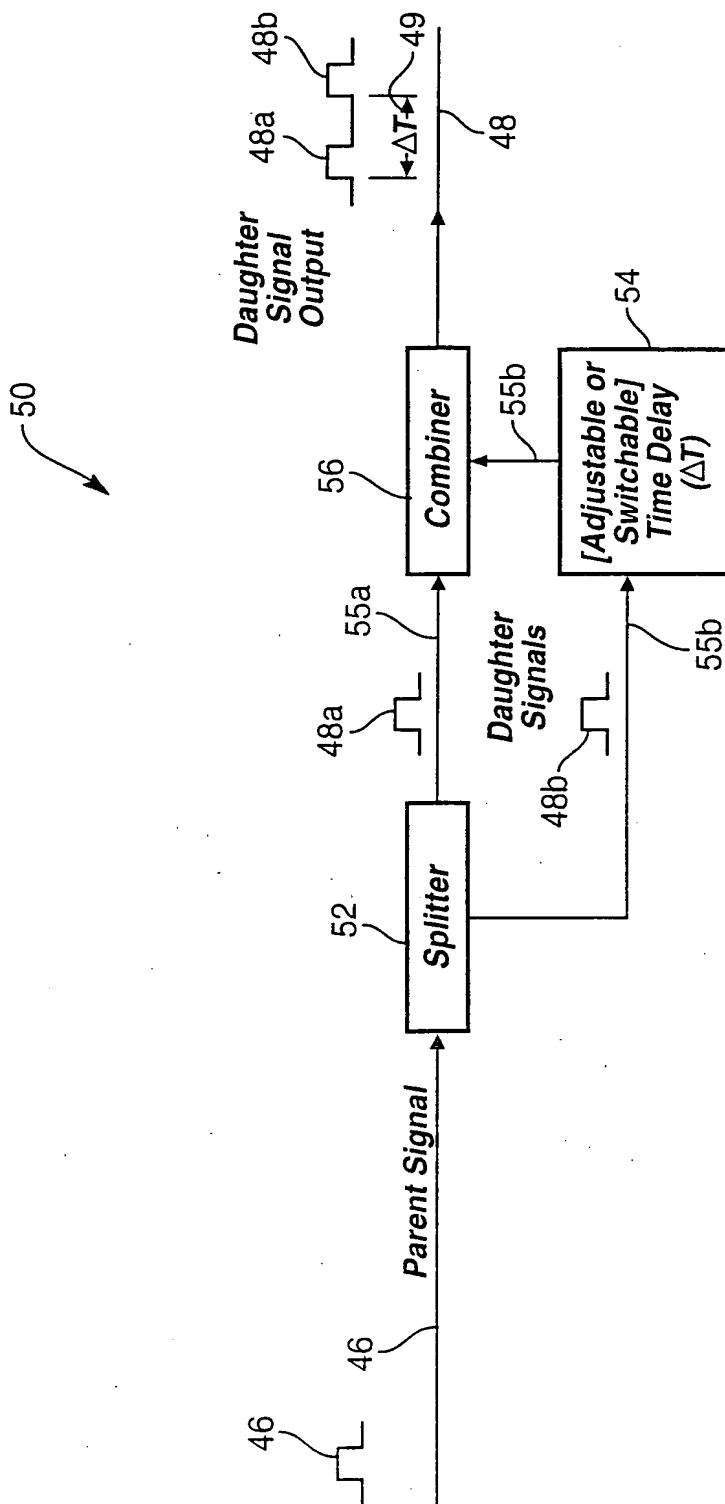


Fig. 2



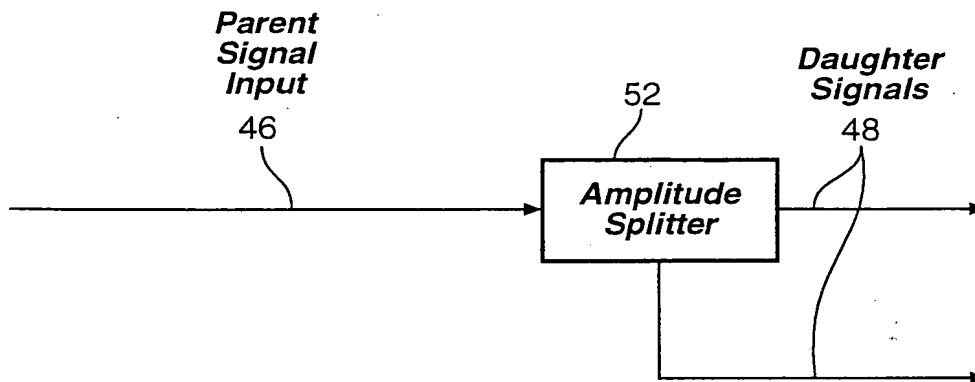
Differential Delay Multiplexer Sender/Encoder

Fig. 3

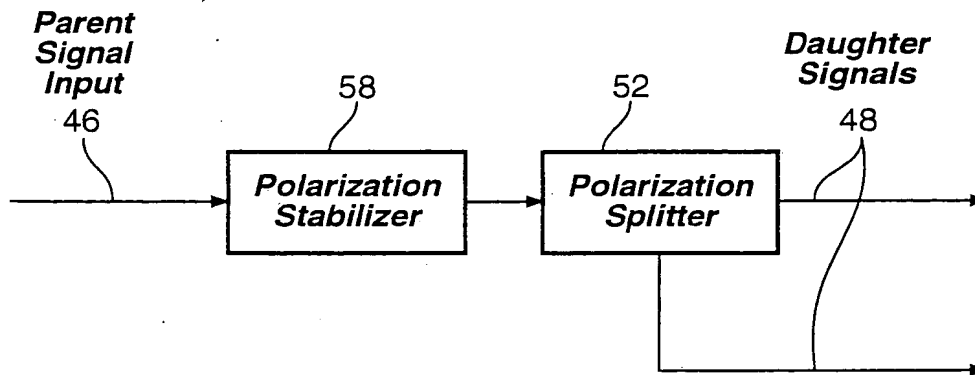


Differential Delay Multiplexer (DDM) Sender/Encoder

Fig. 4

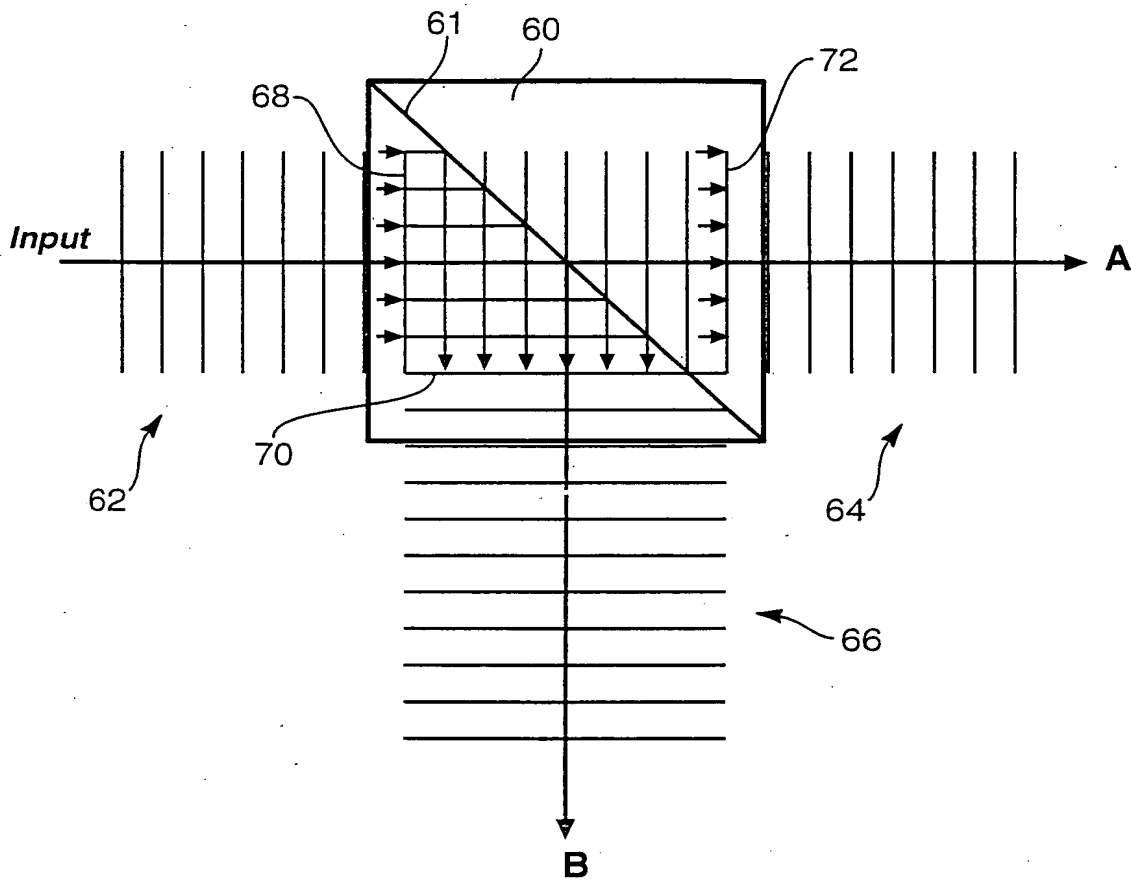


**FIG. 5**



**Splitting Criteria**

**FIG. 6**



Amplitude or Polarization Splitter

**FIG. 7**

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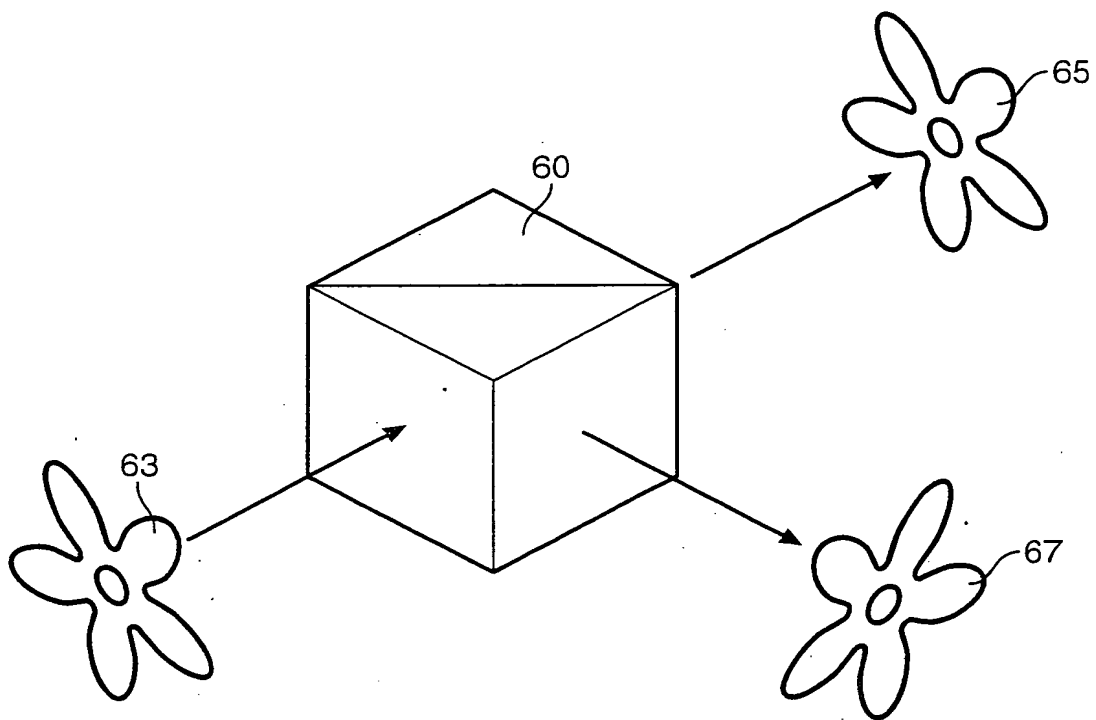
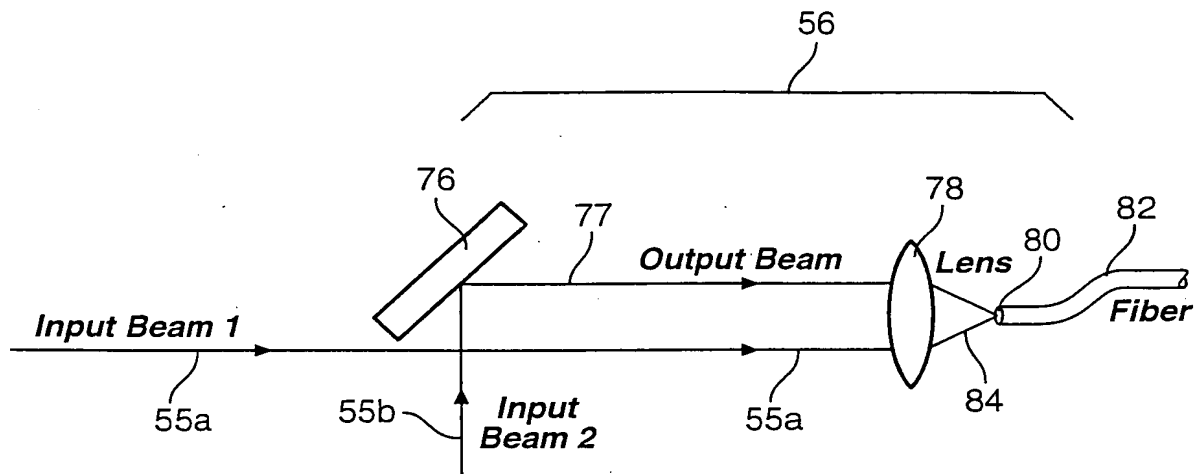


Image Signals Which  
Maintain Spatial Information

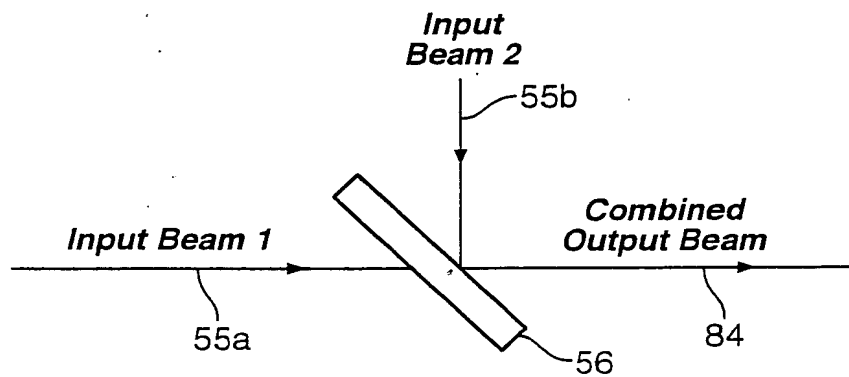
**FIG. 7A**

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Beam Combiner

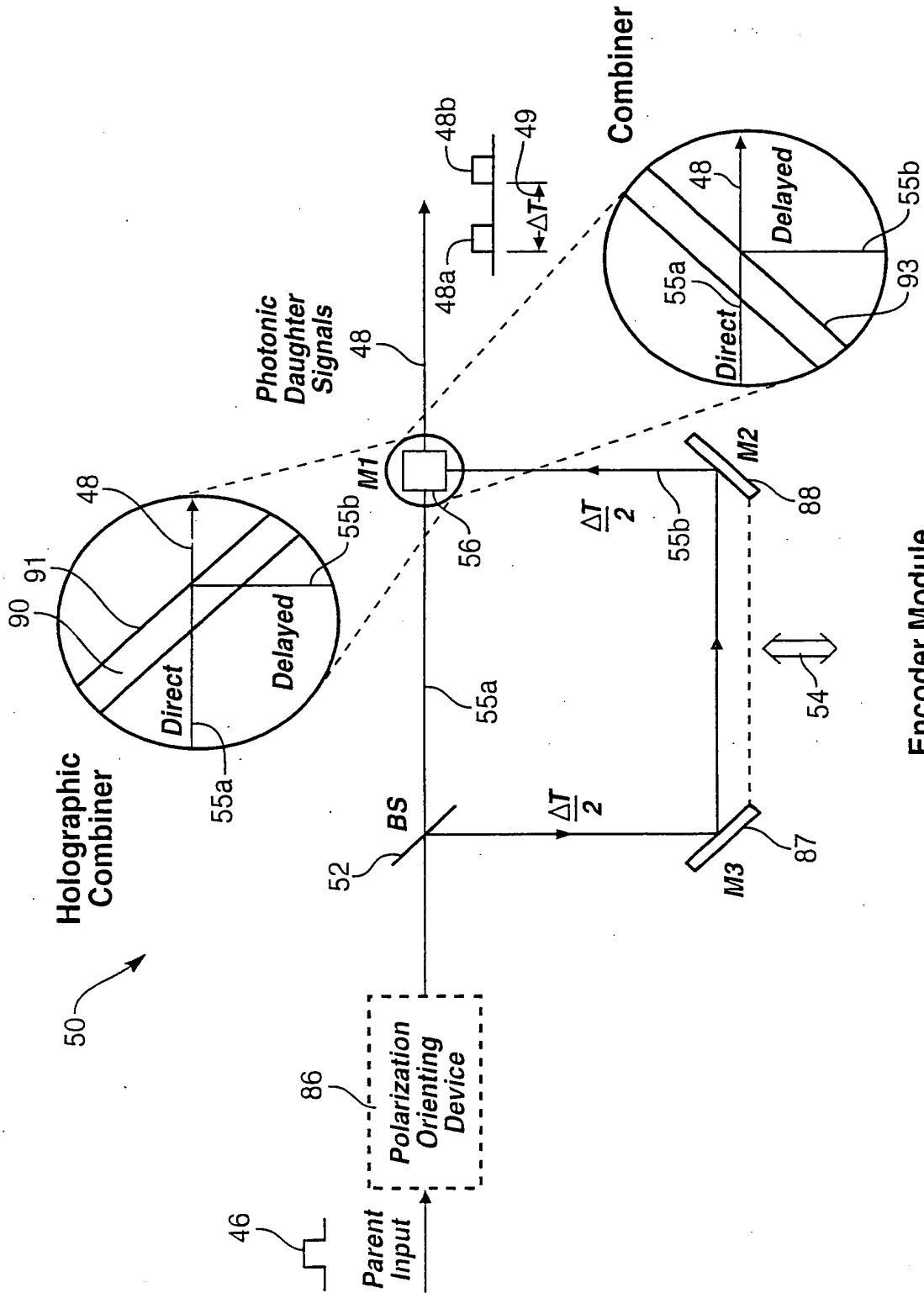
**FIG. 8**



Amplitude or Polarization Combiner

**FIG. 9**

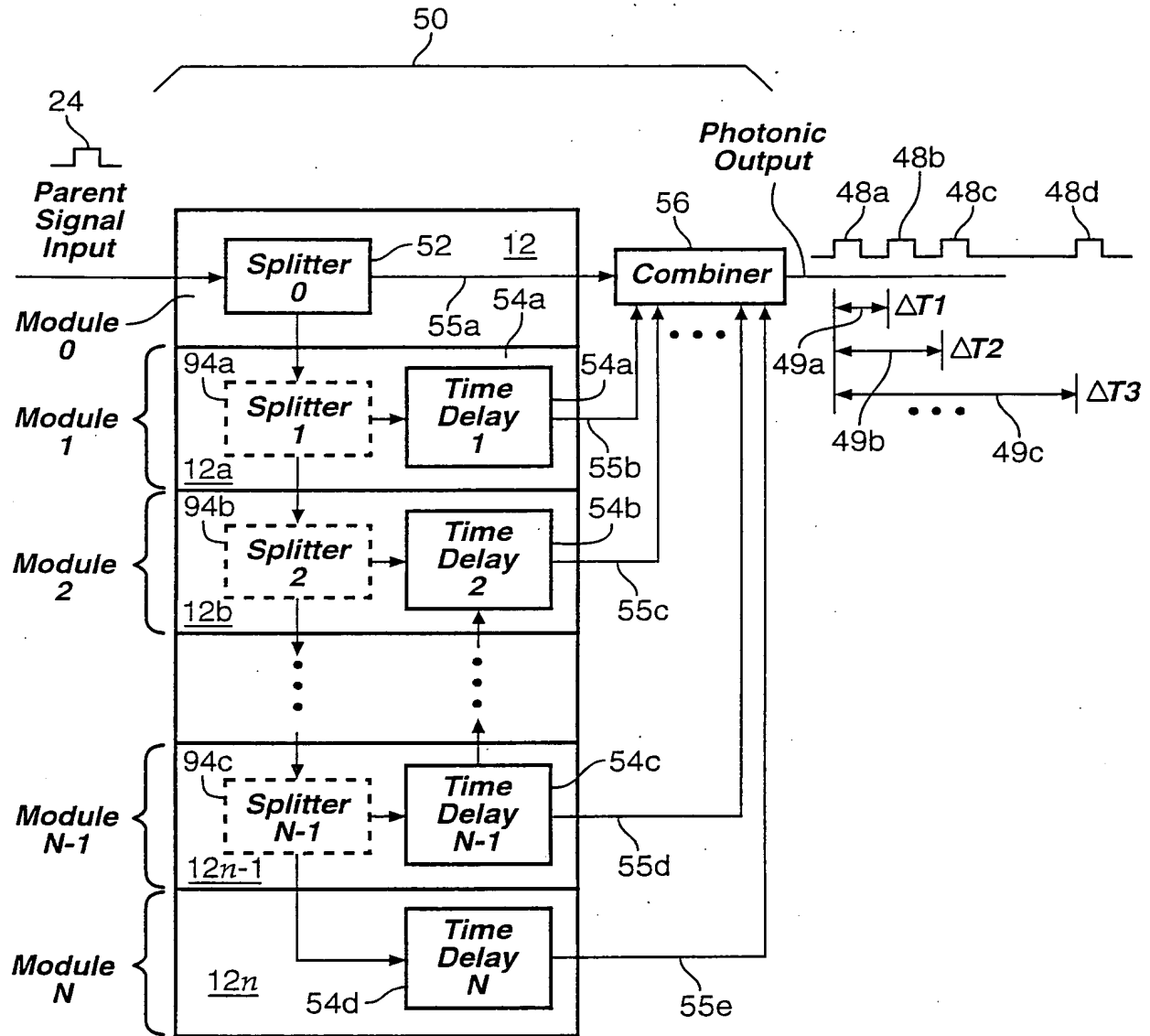




Encoder Module

Fig. 10

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Composite Encoder  
Module Assembly

FIG. 11

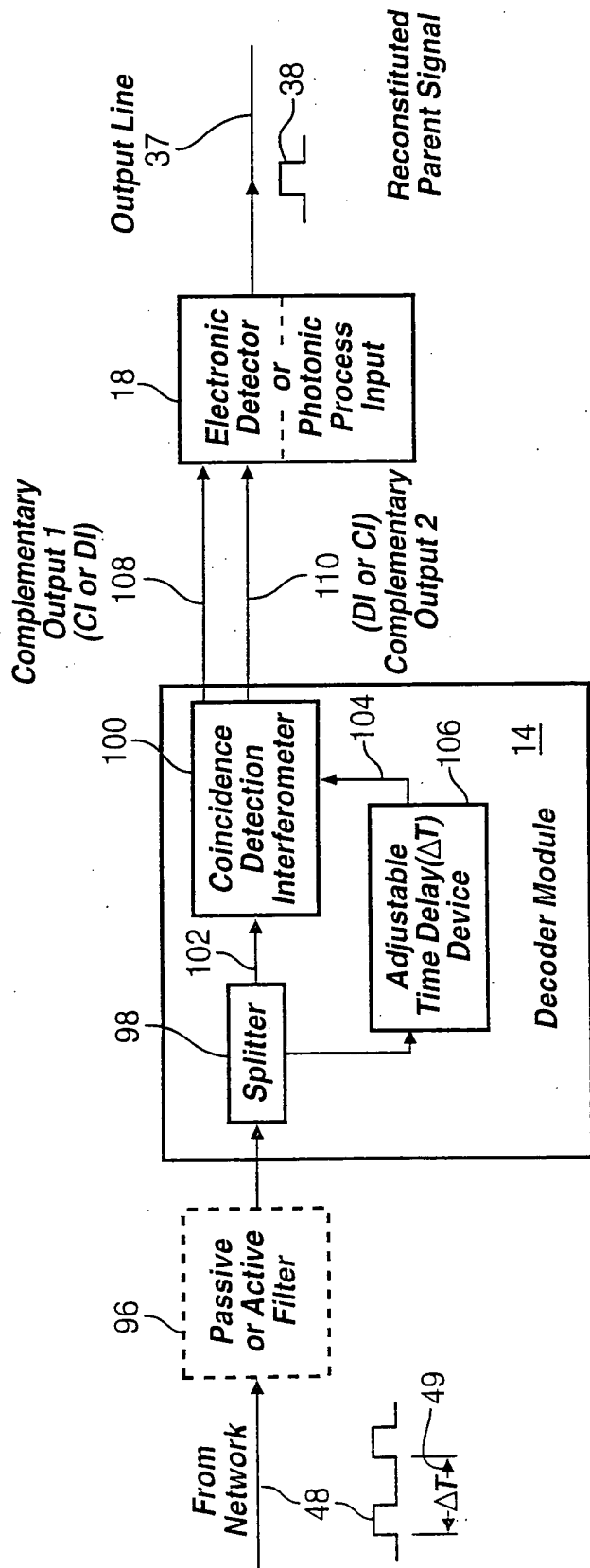


Fig. 12

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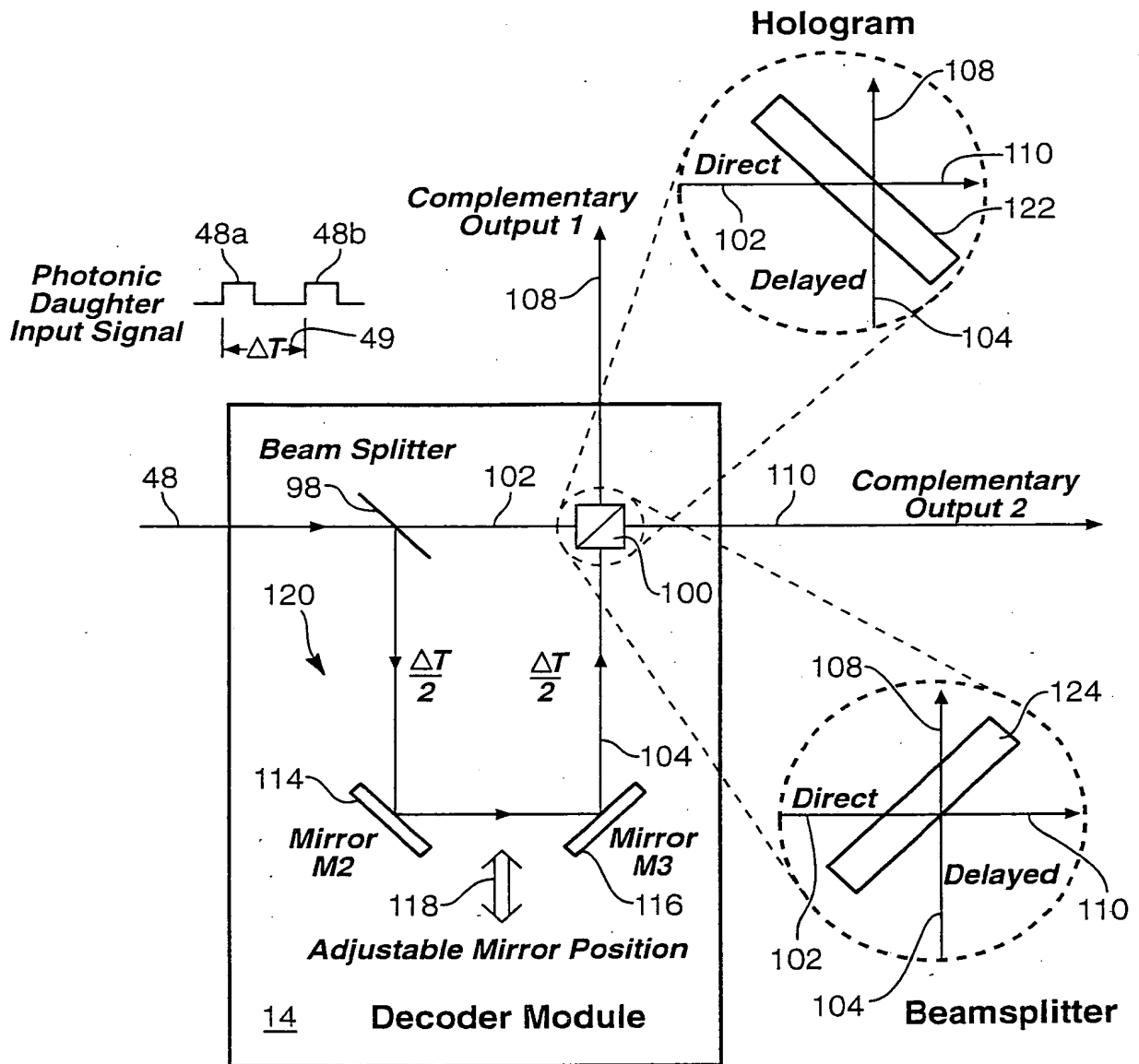


FIG. 13

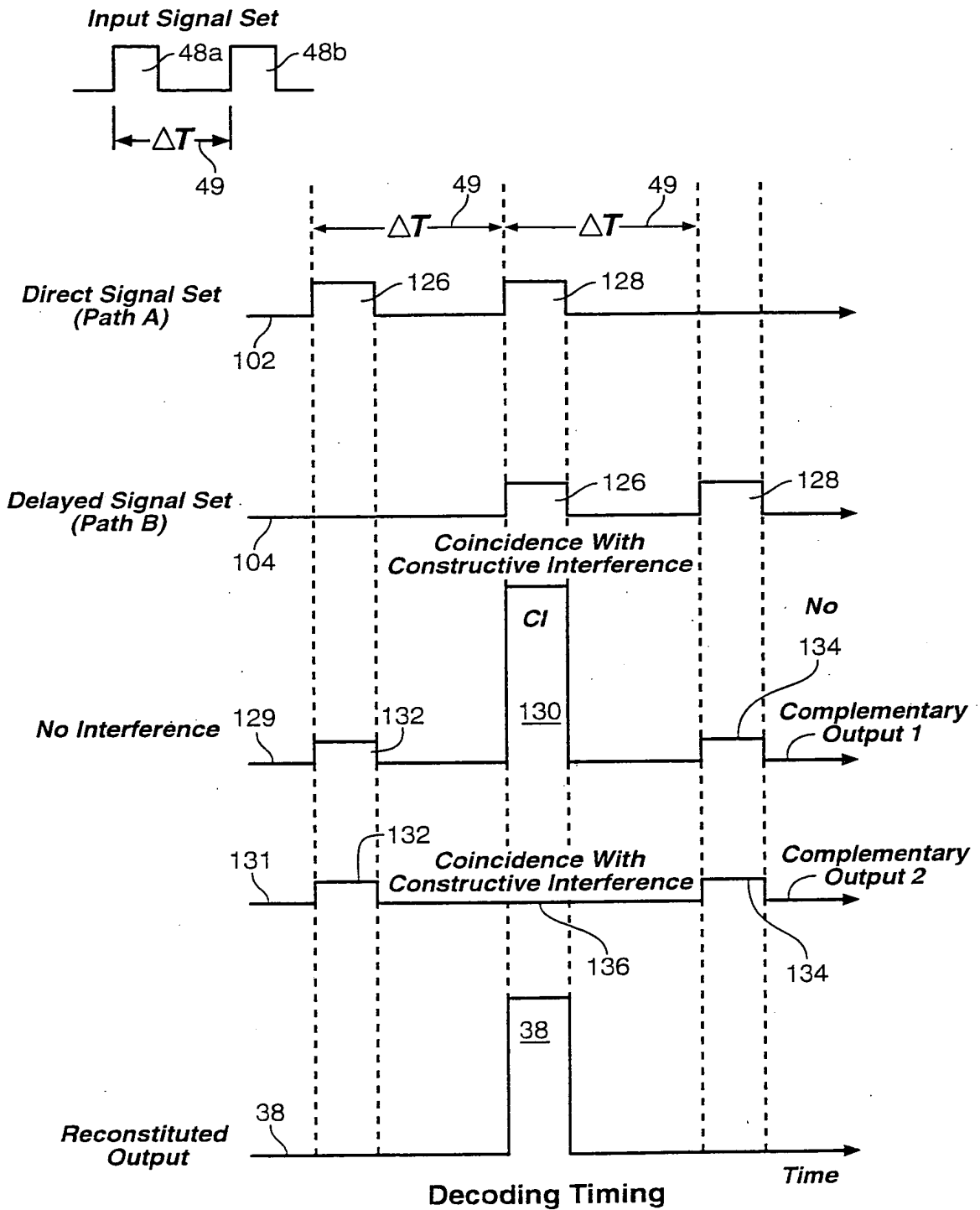


FIG. 14

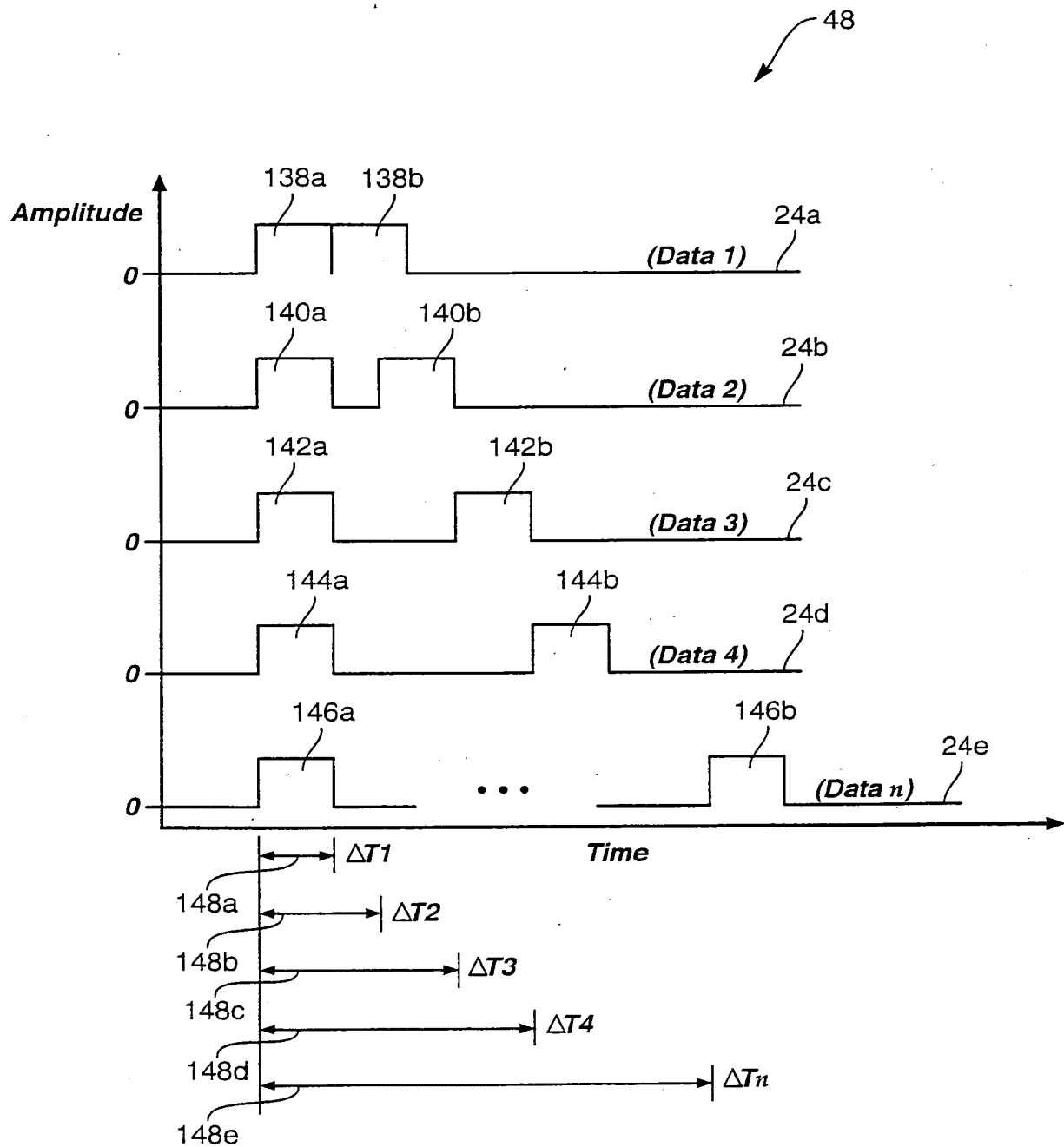


Fig. 15

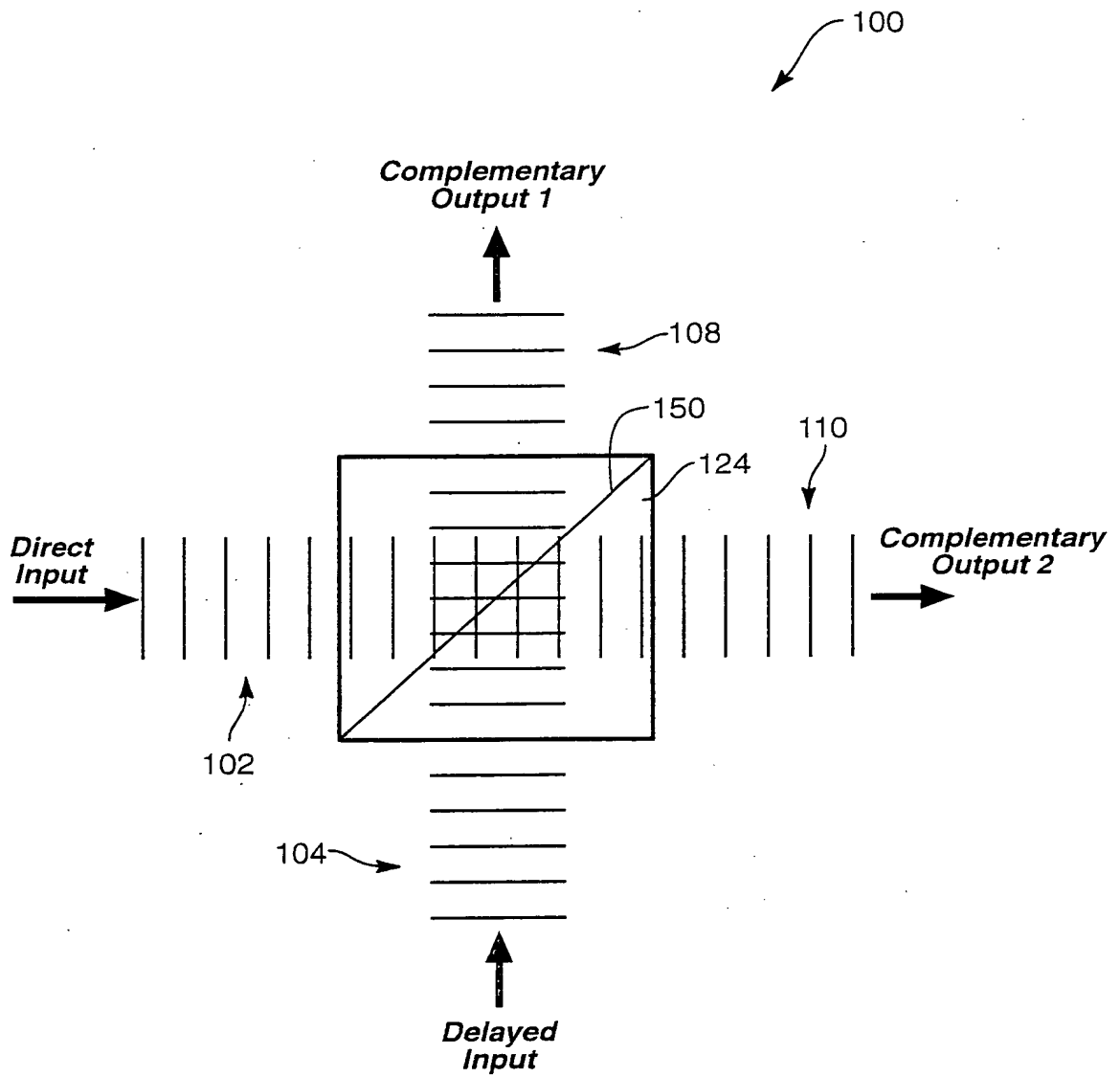


Fig. 16

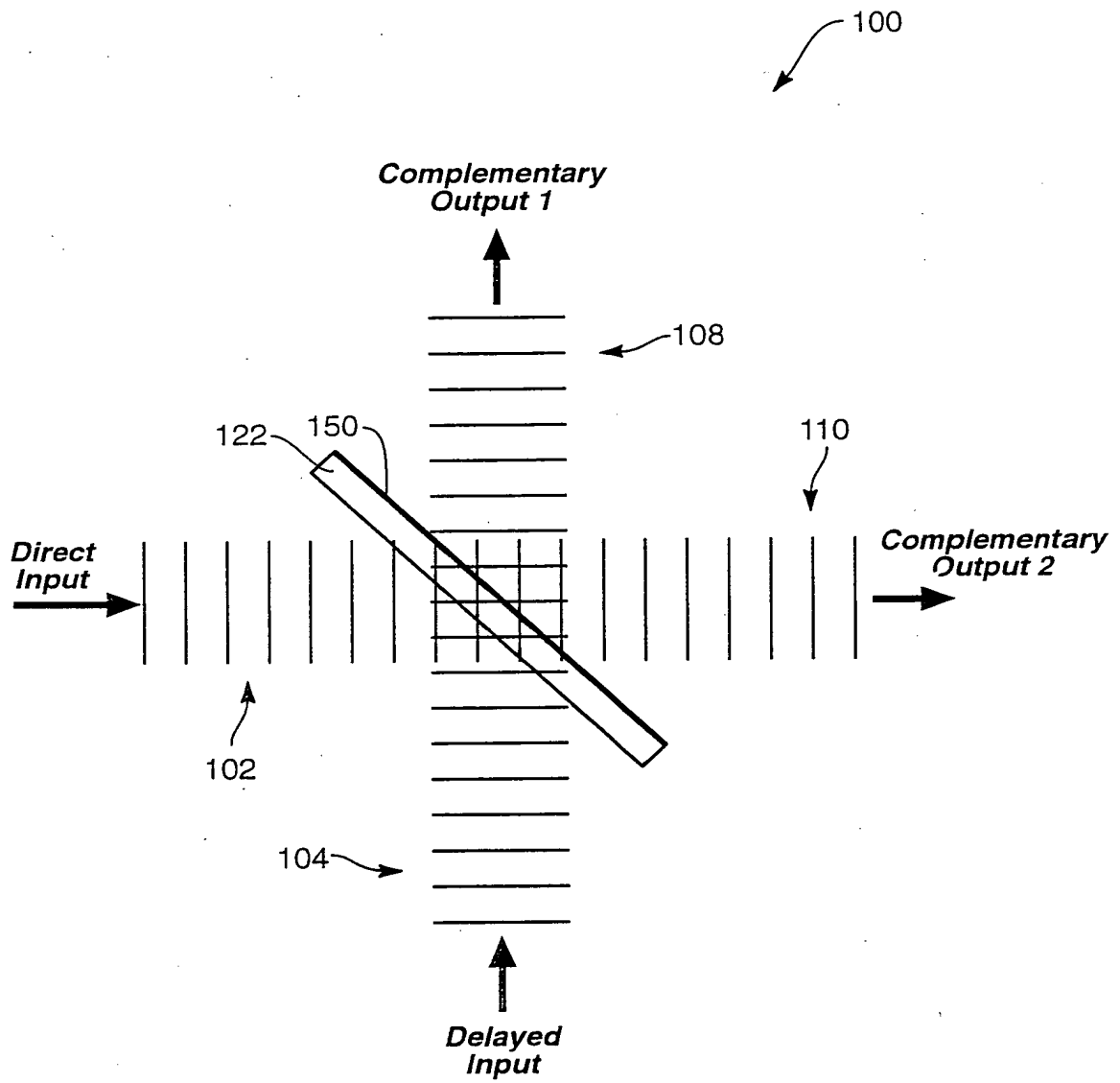
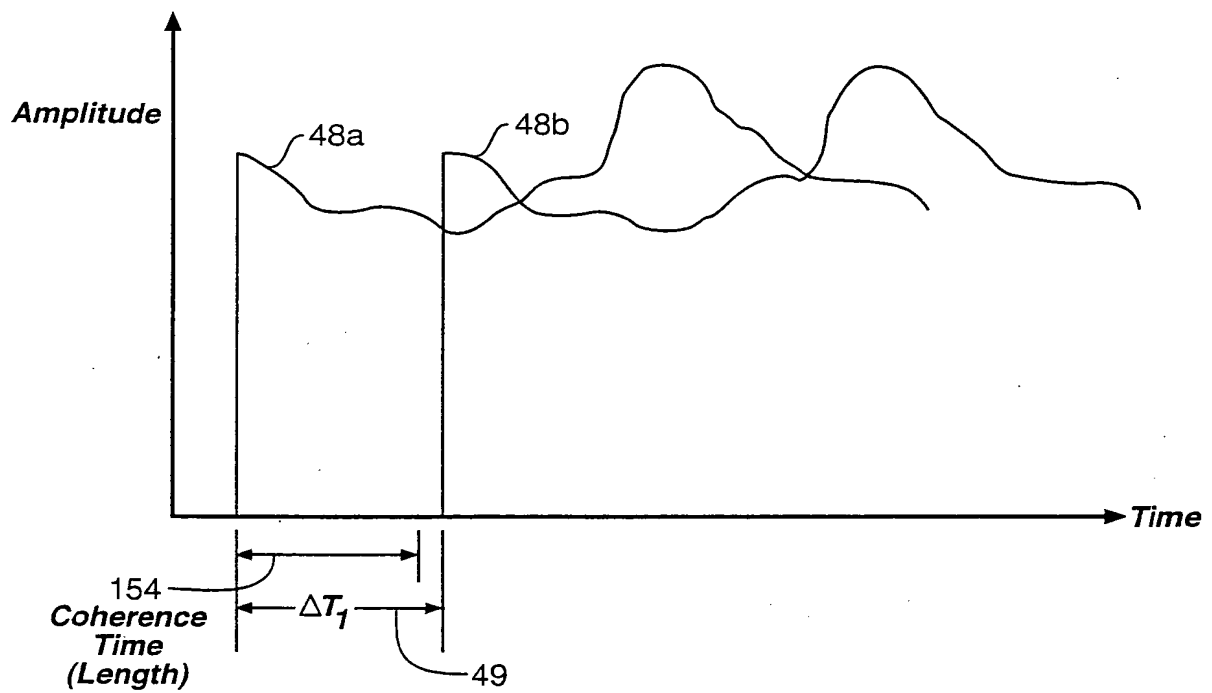


Fig. 17



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**Fig. 18**

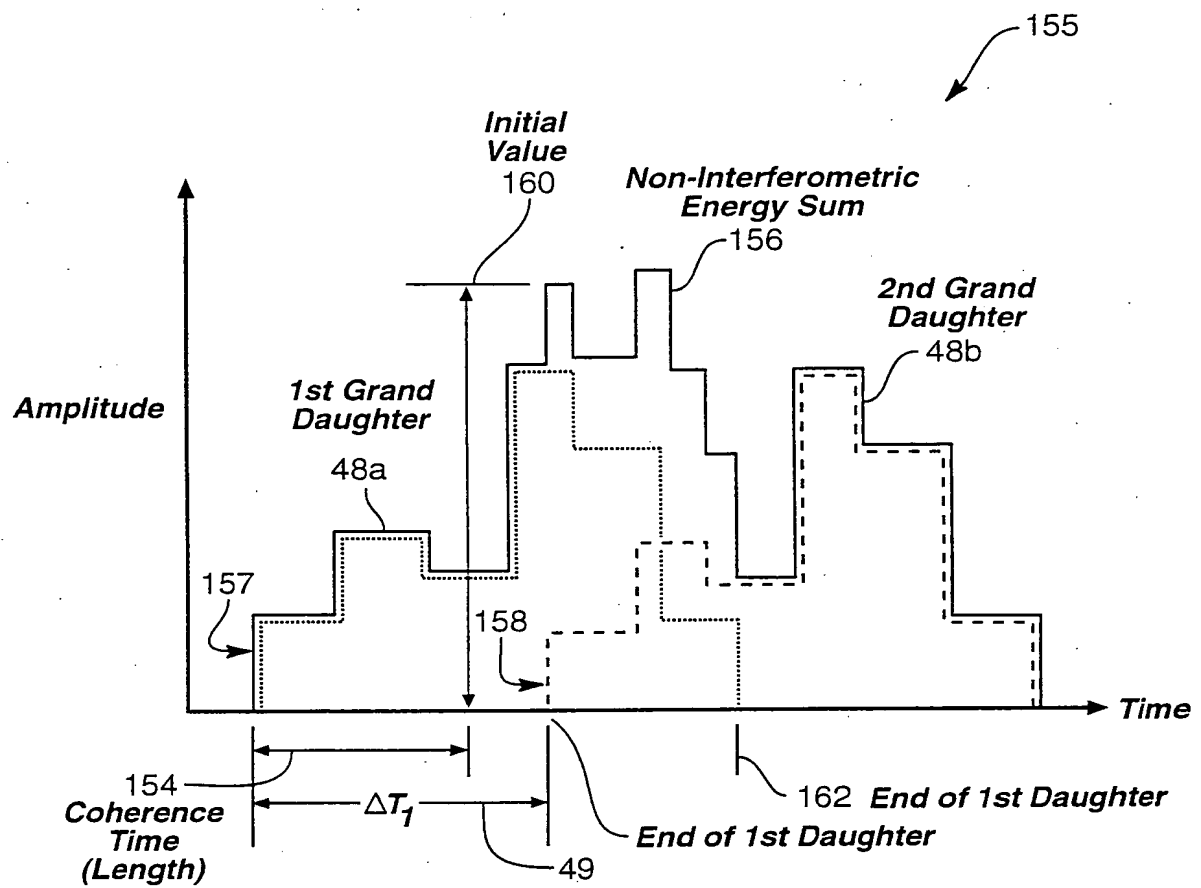


Fig. 19

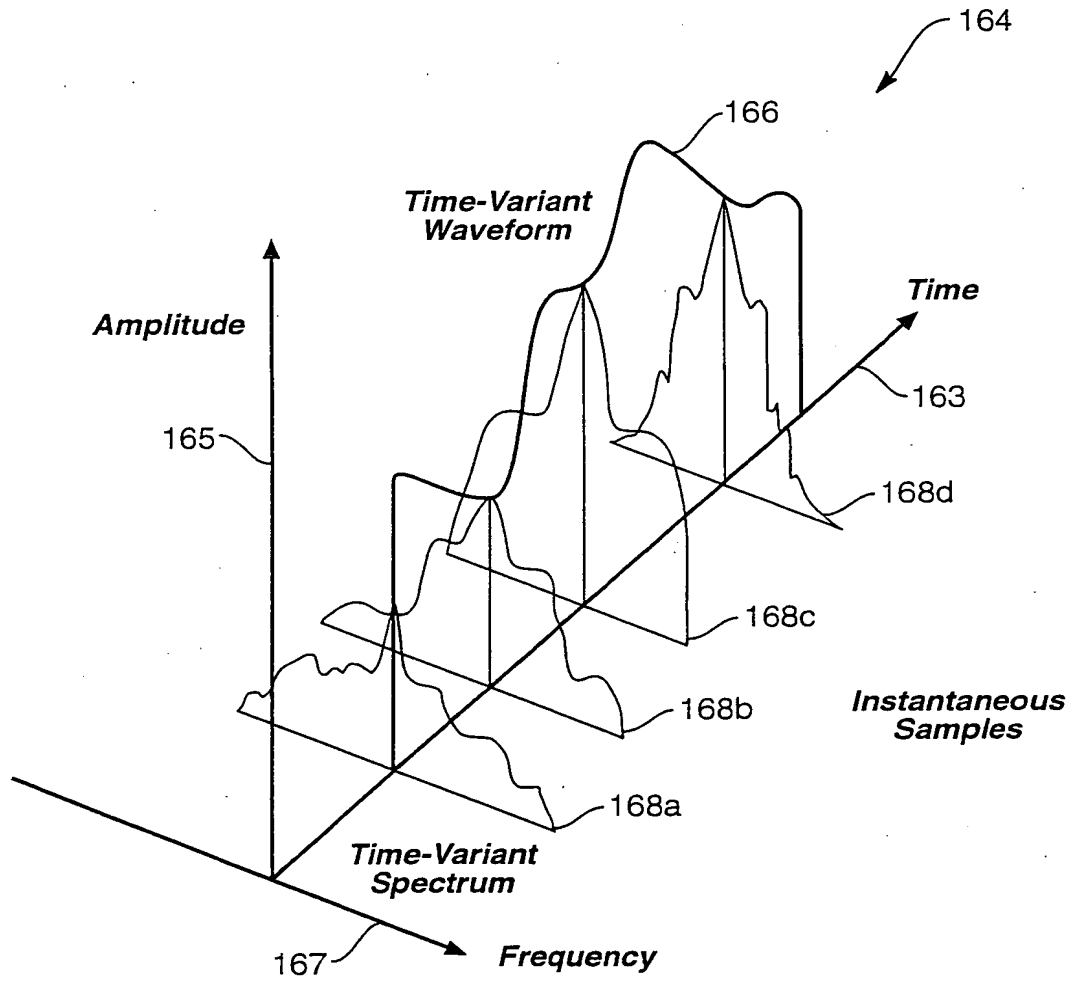
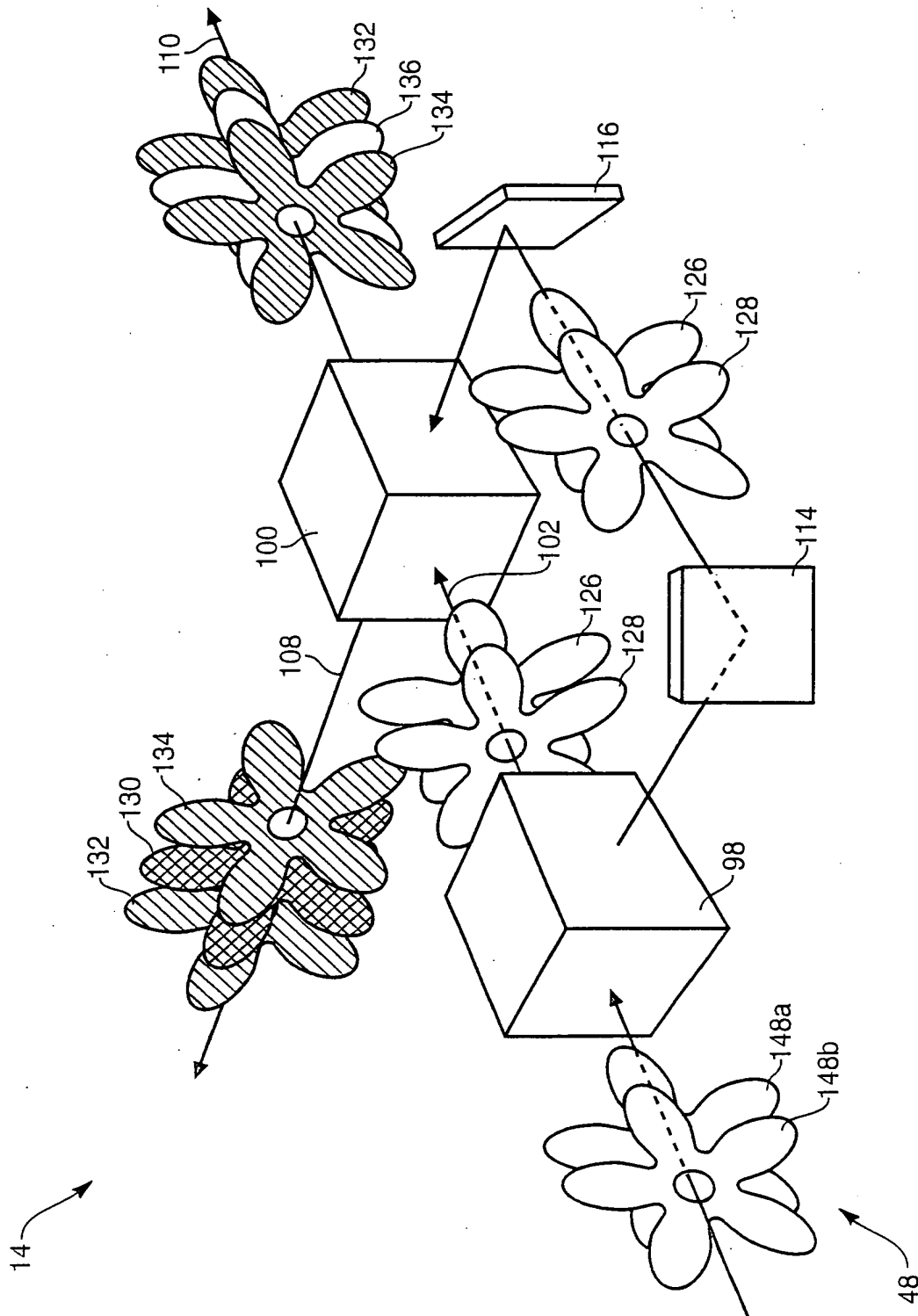
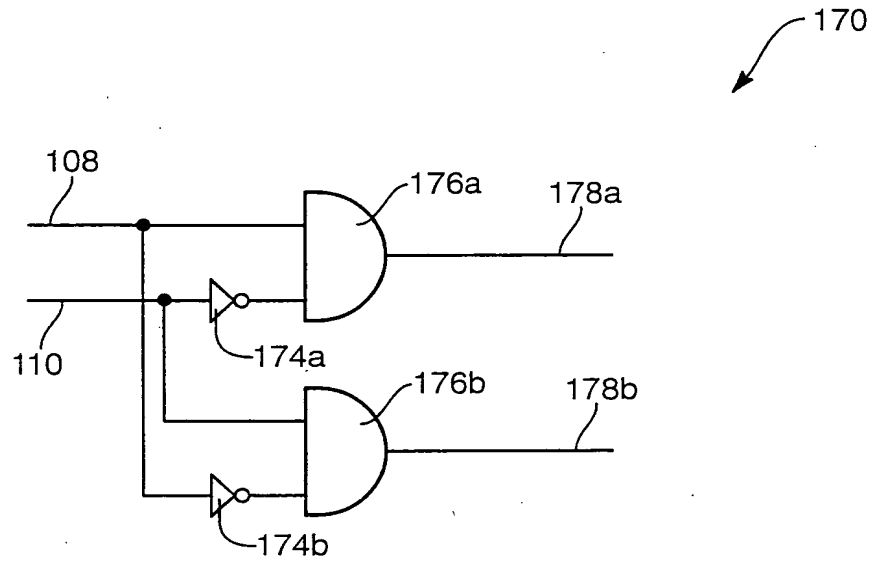


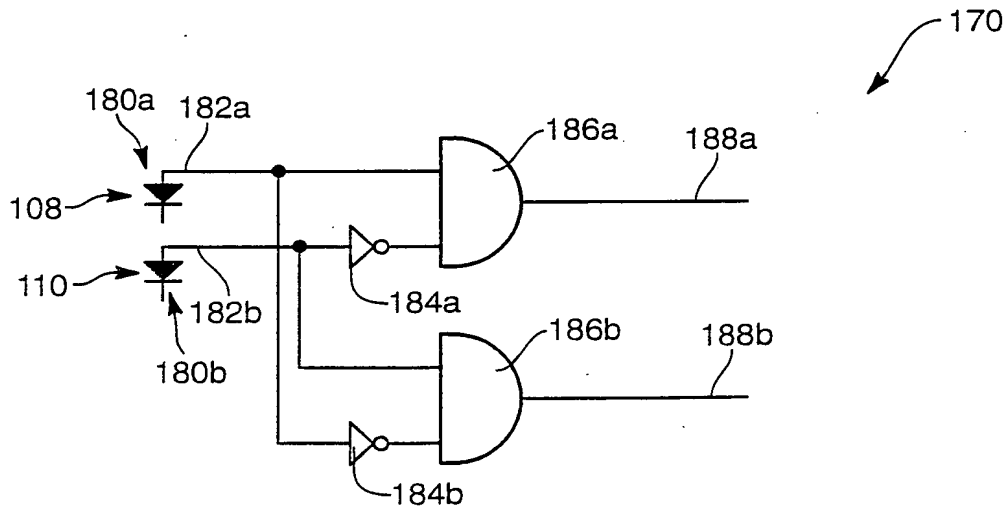
Fig. 20



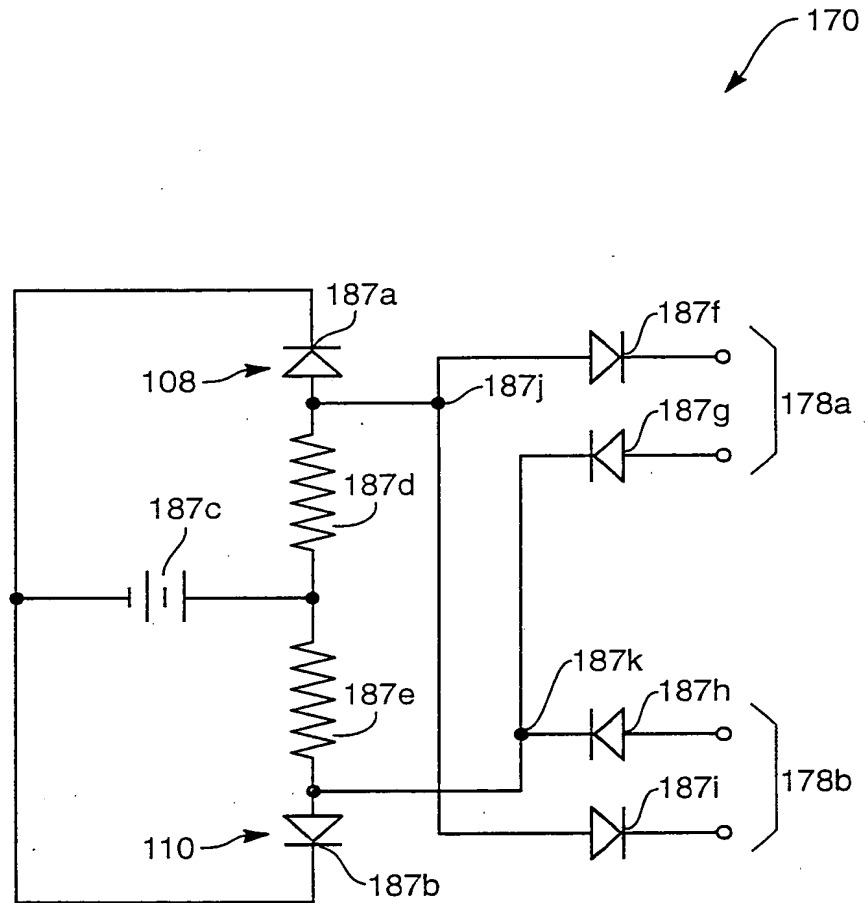
**Fig. 21**



**Photonic Processor**  
**Fig. 22**



**Electronic Processor**  
**Fig. 23A**



Electronic Processor

*Fig. 23B*

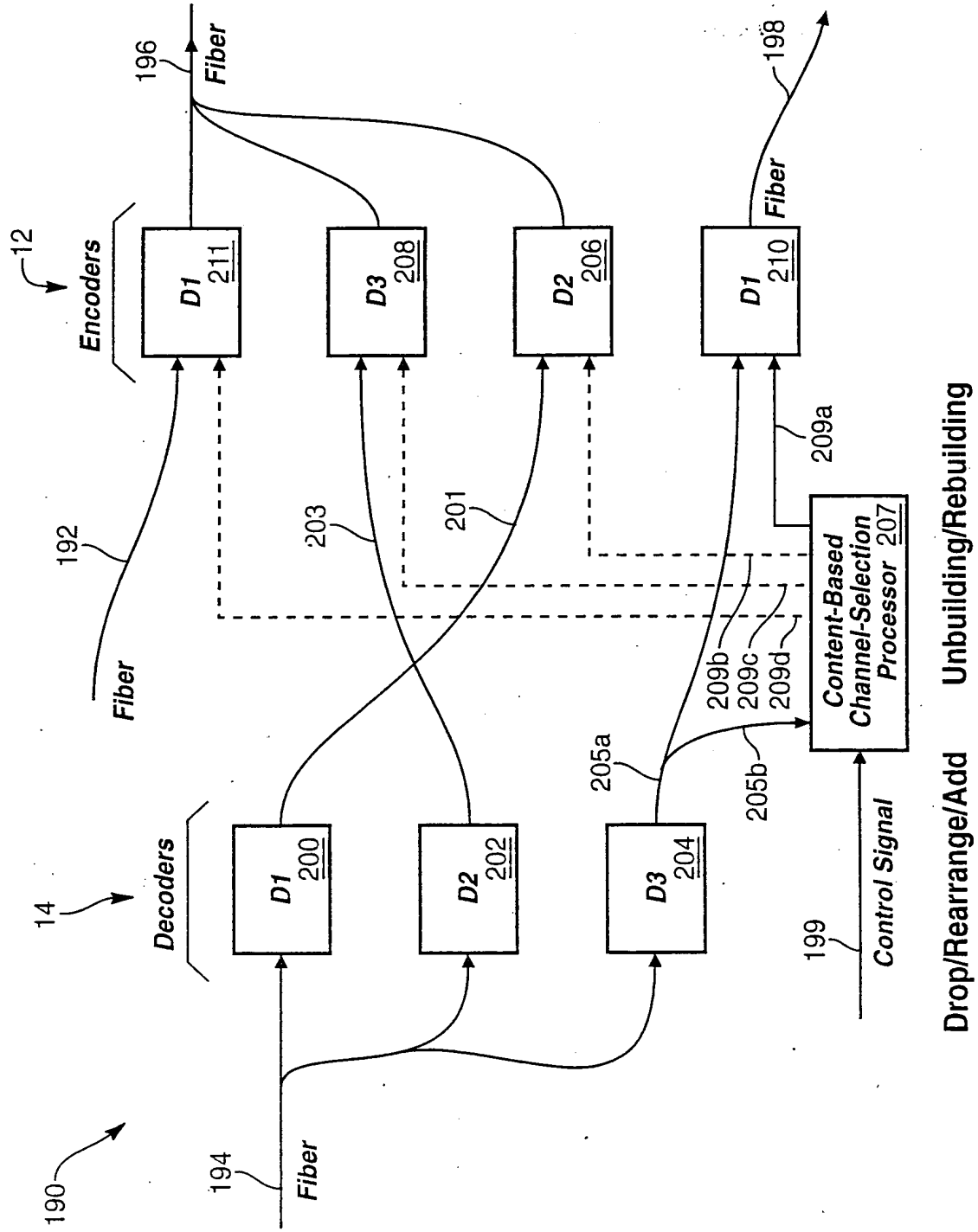
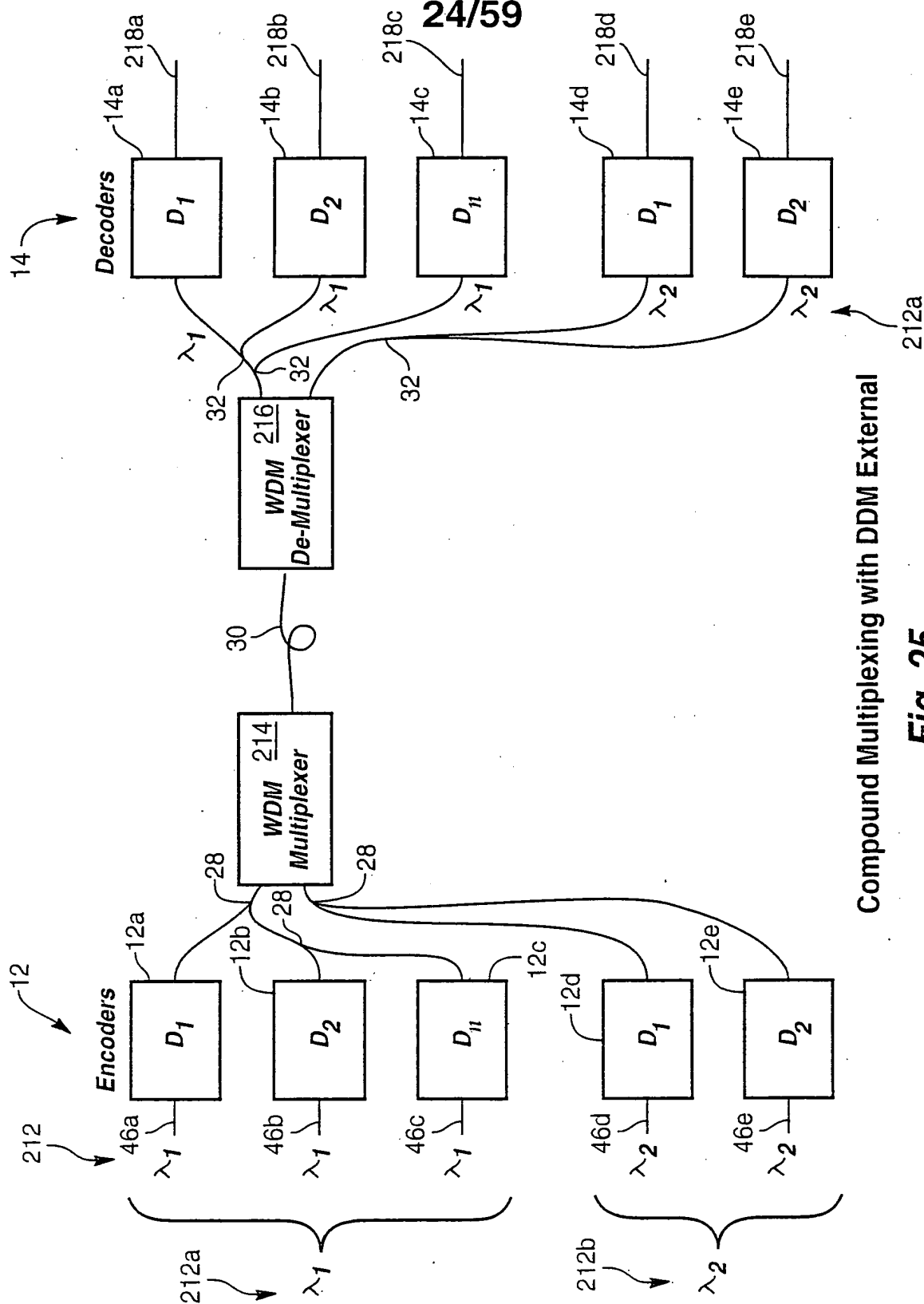


Fig. 24

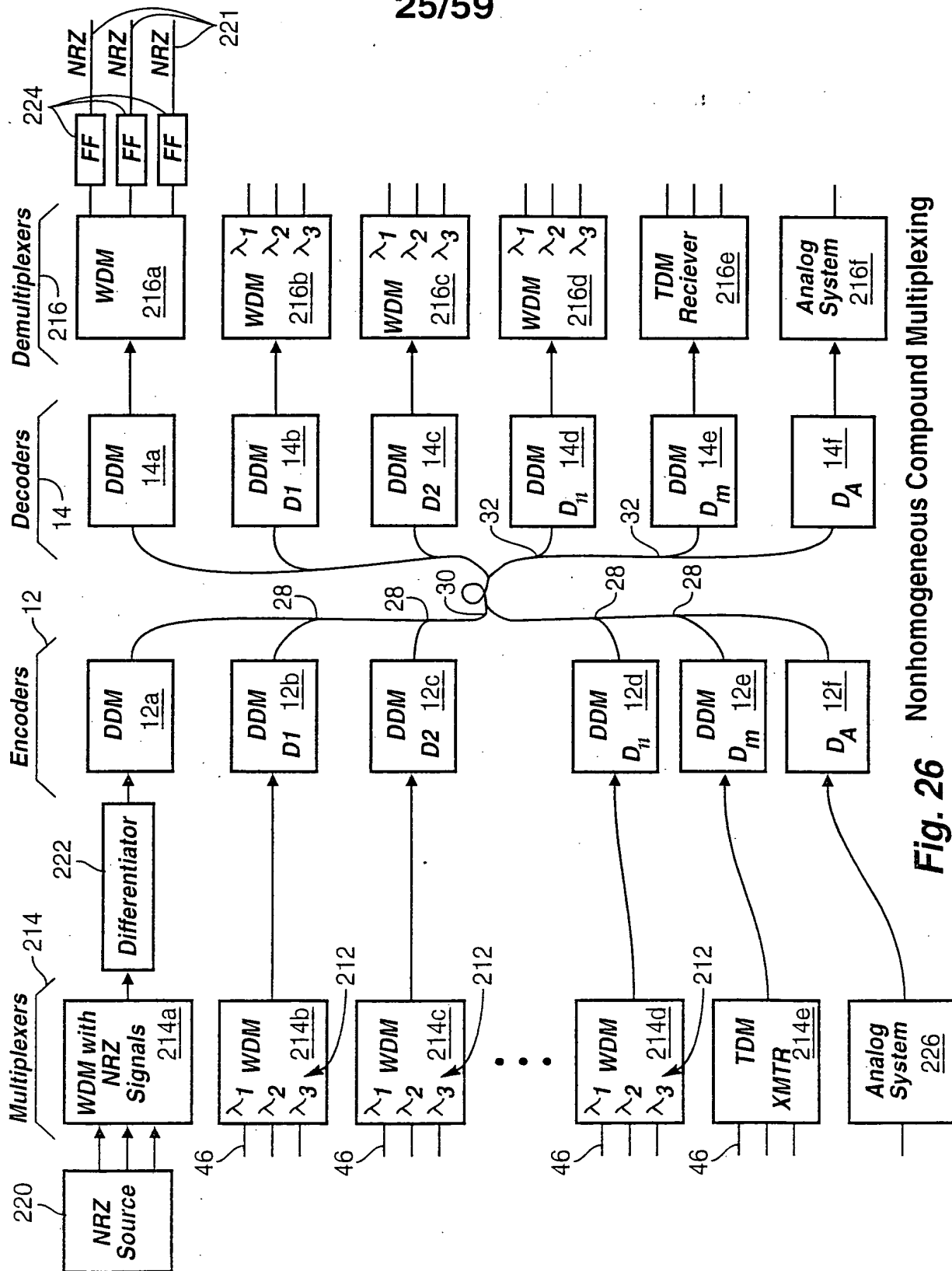
Drop/Rearrange/Add      Unbuilding/Rebuilding



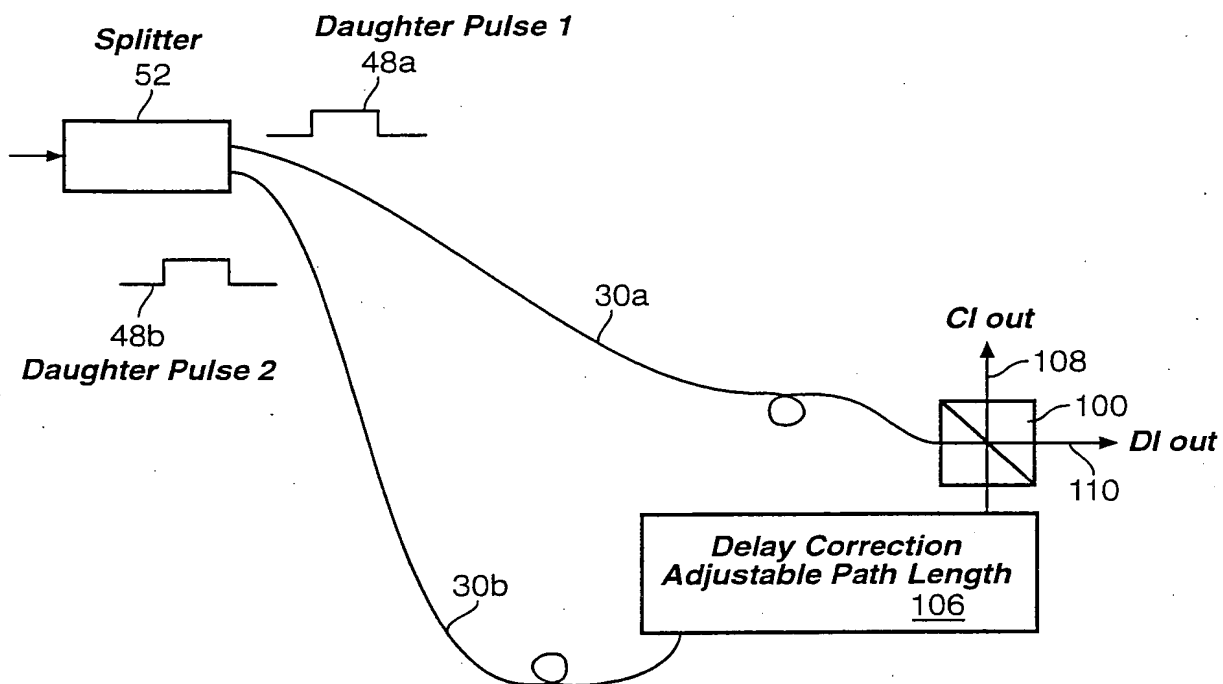
Compound Multiplexing with DDM External

Fig. 25





**Fig. 26** Nonhomogeneous Compound Multiplexing



Multiple Delay Path  
Integrated Delay and  
Delay Correction

FIG. 27

# Photonic NRZ Interface

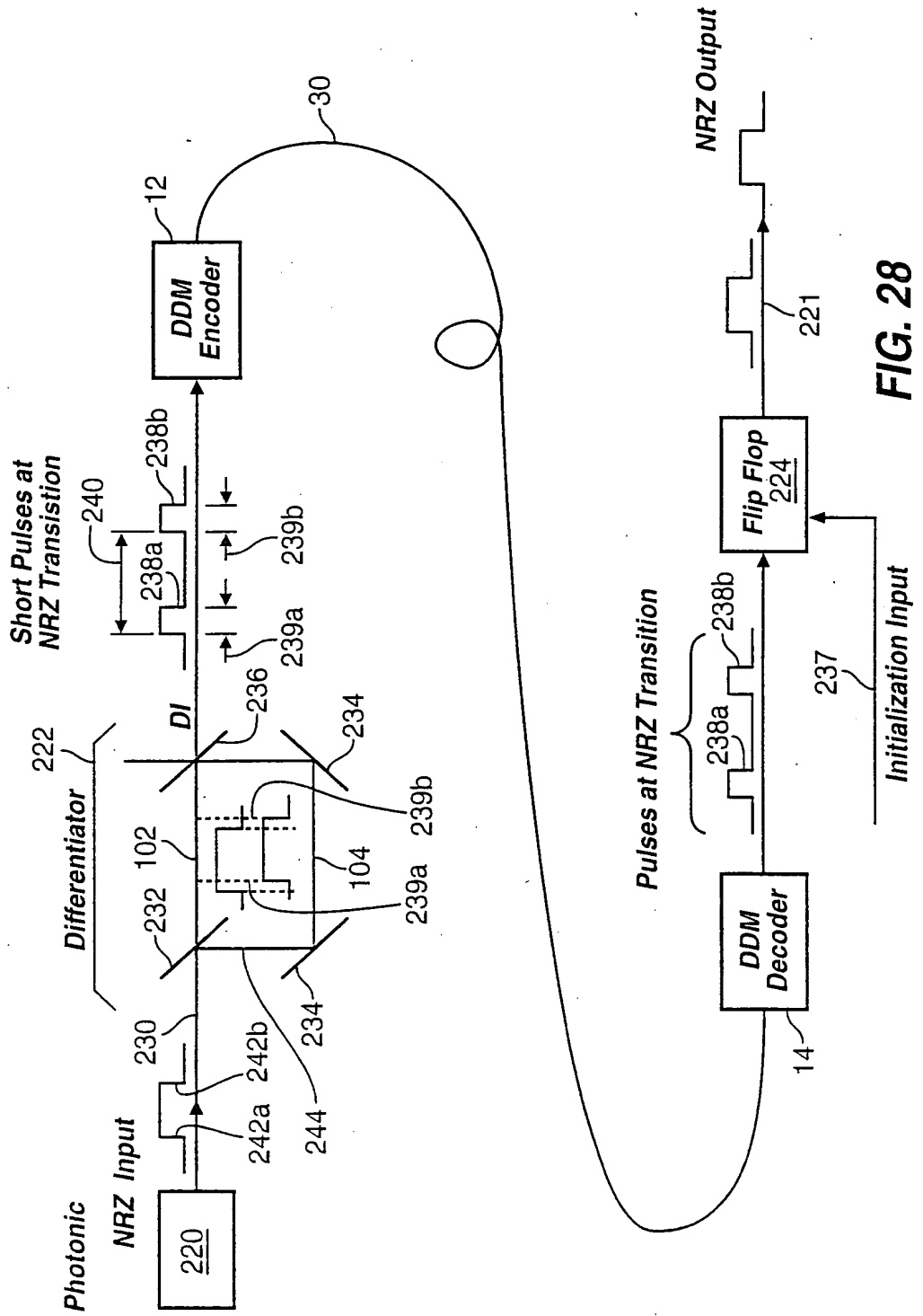


FIG. 28

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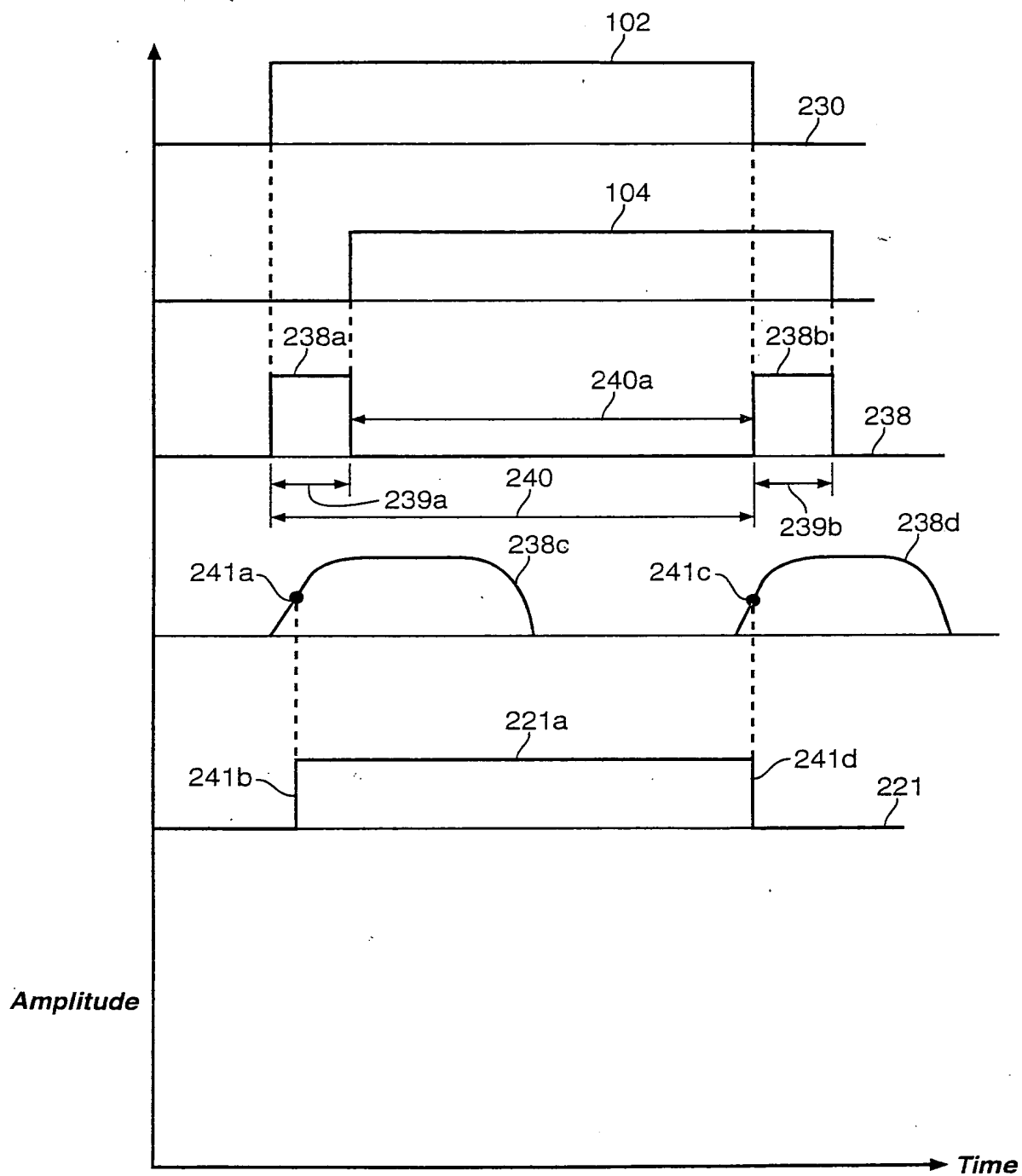
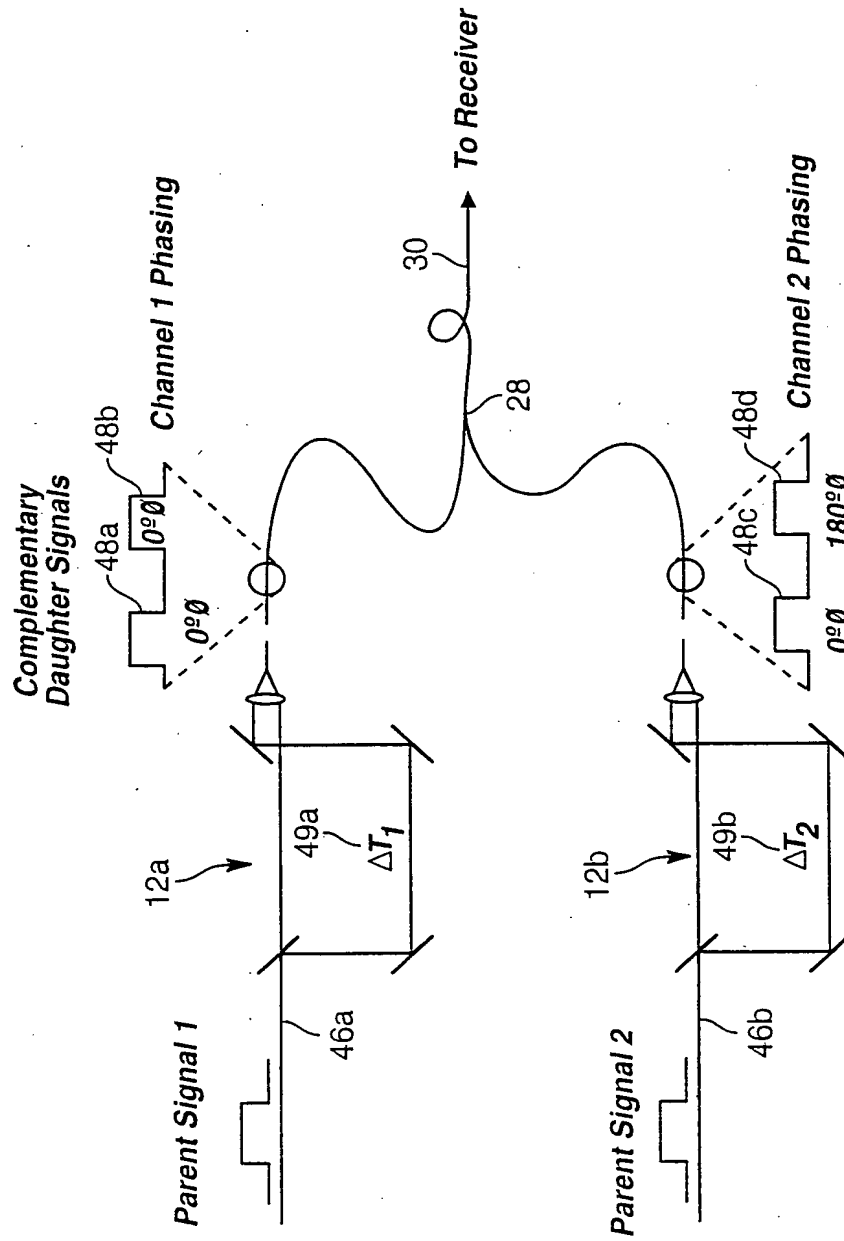


FIG. 29



Phase Sequenced Dual Channel Encoder

FIG. 30

## Phase Sequenced Dual Channel Decoder

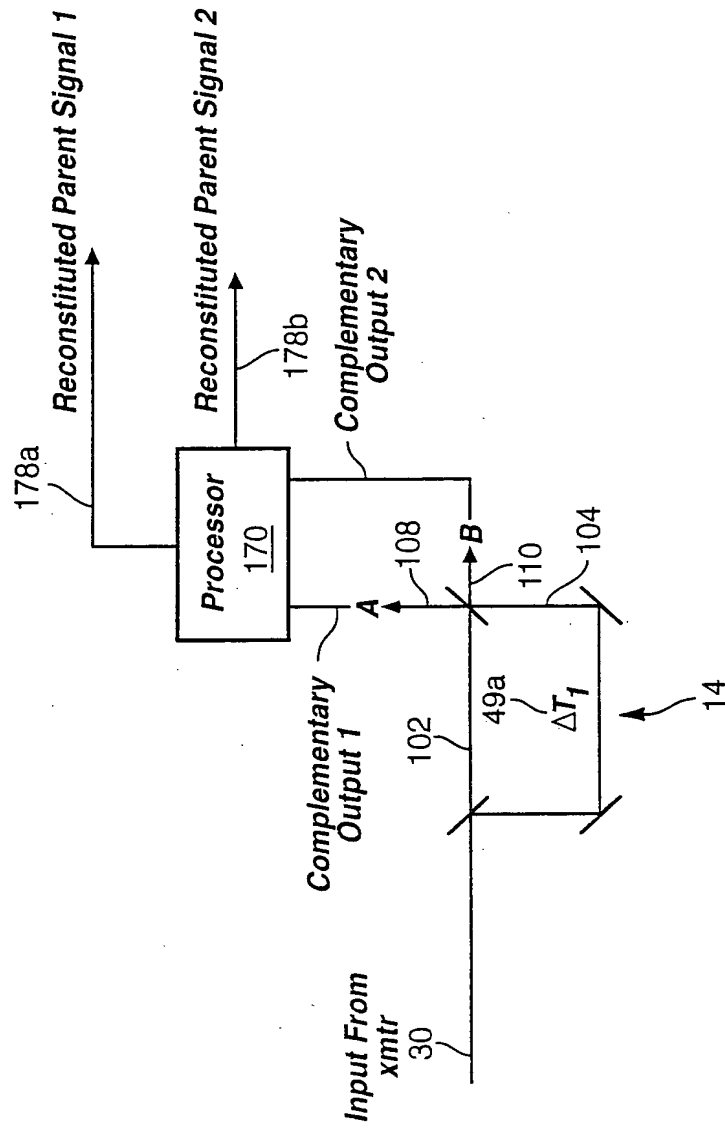


FIG. 31

Phase Sequence Timing

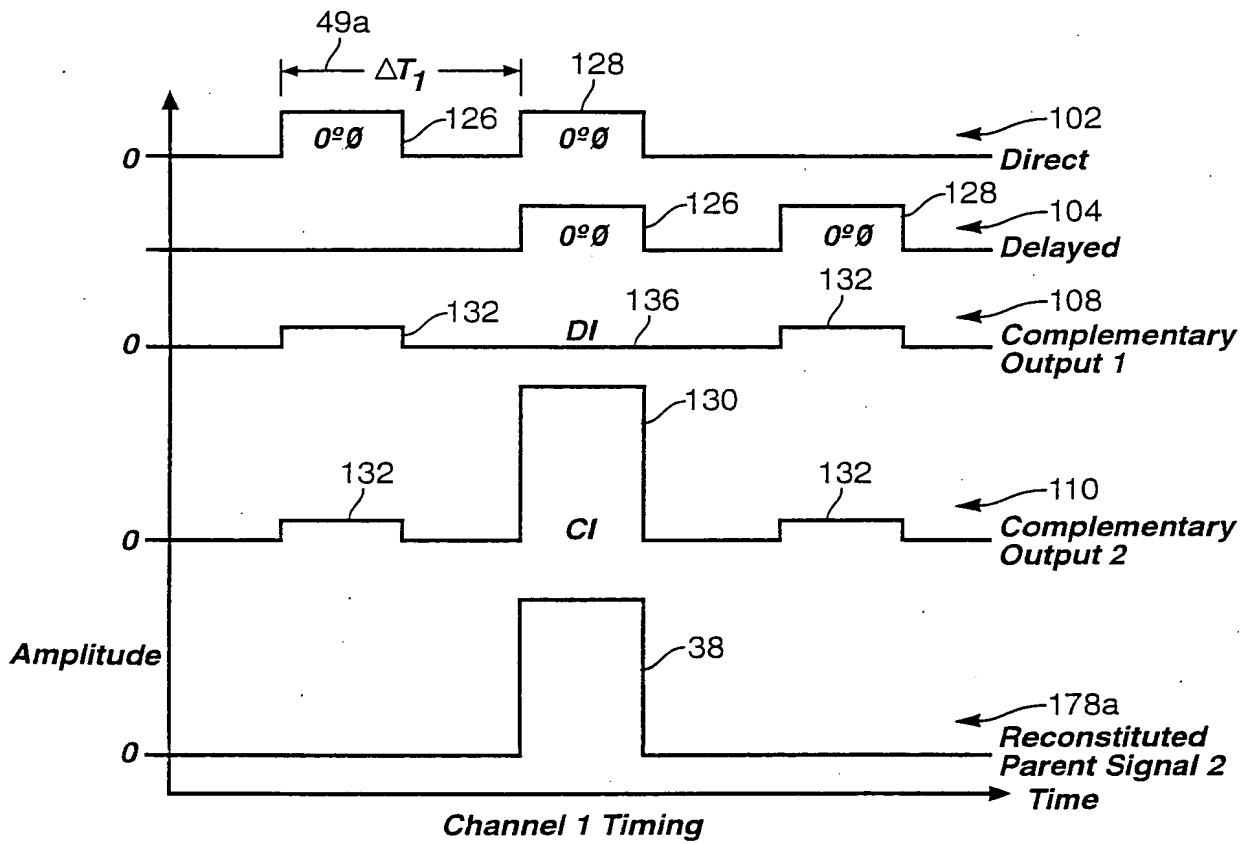


FIG. 32

Phase Sequence Timing

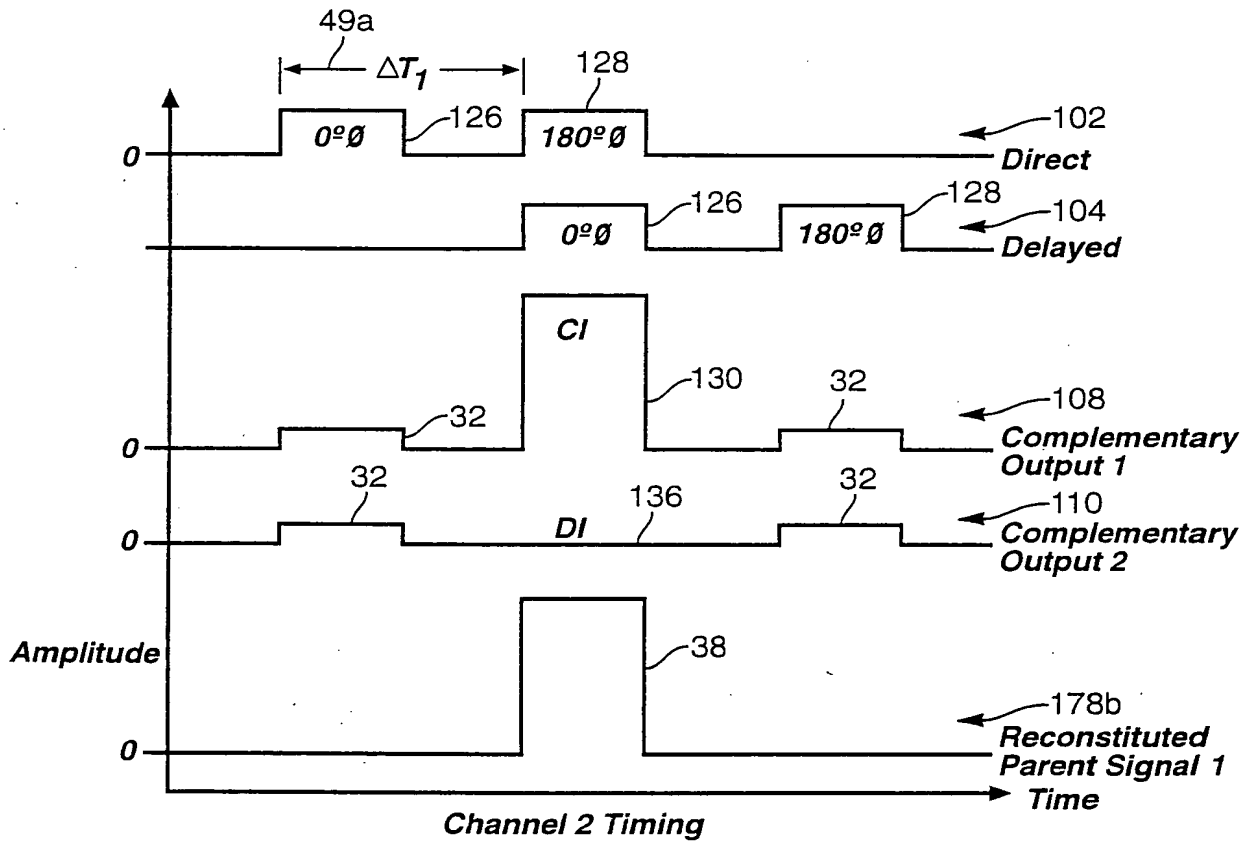


FIG. 33



# Quadrature Encoding/Decoding Apparatus

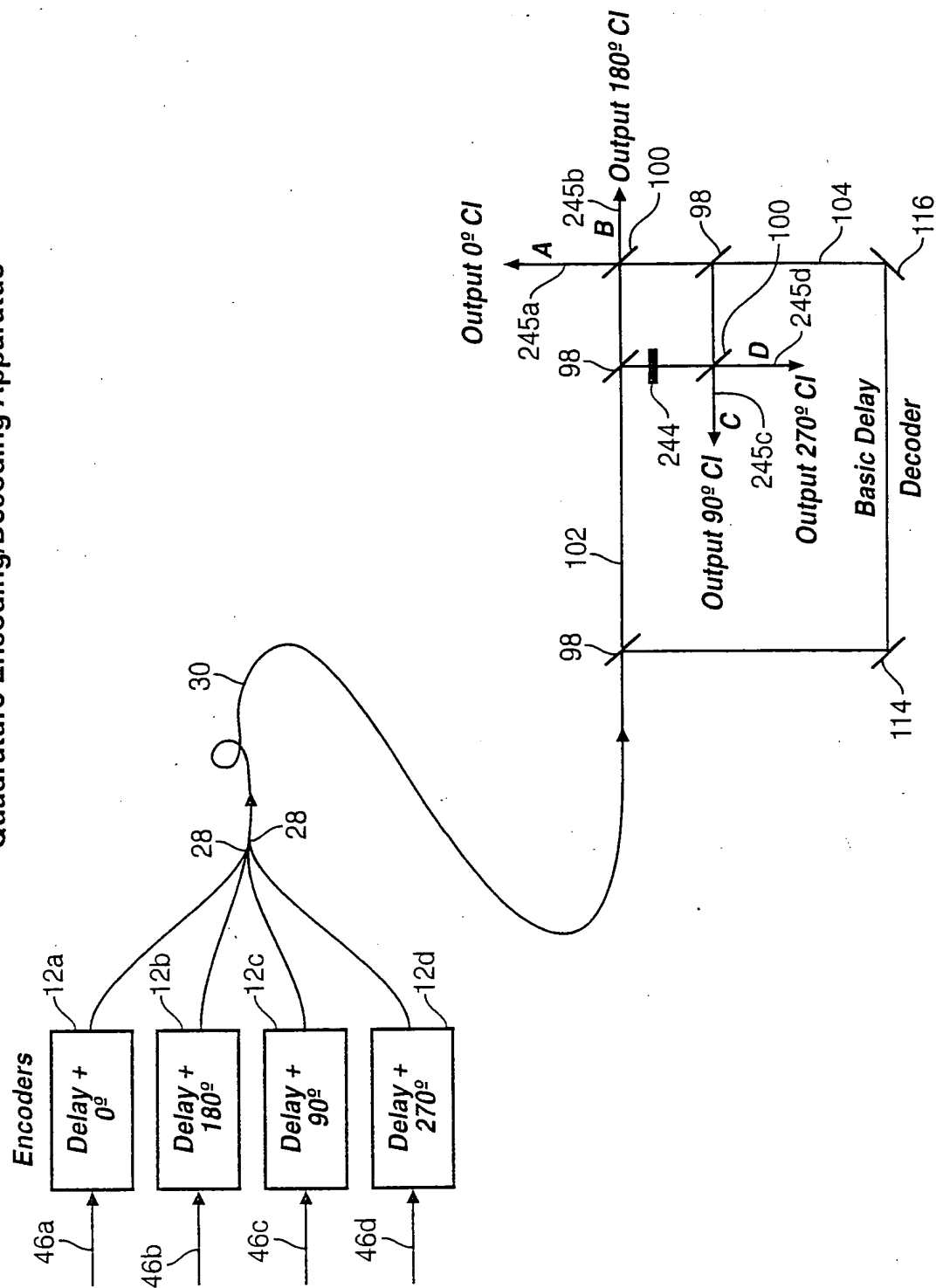


FIG. 34

	<i>Phase of Direct Signal</i>	<i>Phase of Delayed Signal</i>	<i>Quadrature Outputs</i>			
			<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
46a → <i>Channel 1</i>	0	0	<i>CI</i>	<i>DI</i>	<i>C = D</i>	
46b → <i>Channel 2</i>	0	180	<i>DI</i>	<i>CI</i>	<i>C = D</i>	
46c → <i>Channel 3</i>	0	90	<i>A = B</i>		<i>CI</i>	<i>DI</i>
46d → <i>Channel 4</i>	0	270	<i>A = B</i>		<i>DI</i>	<i>CI</i>

245a   245b   245c   245d

FIG. 35

Quadrature Wave Forms For One Channel

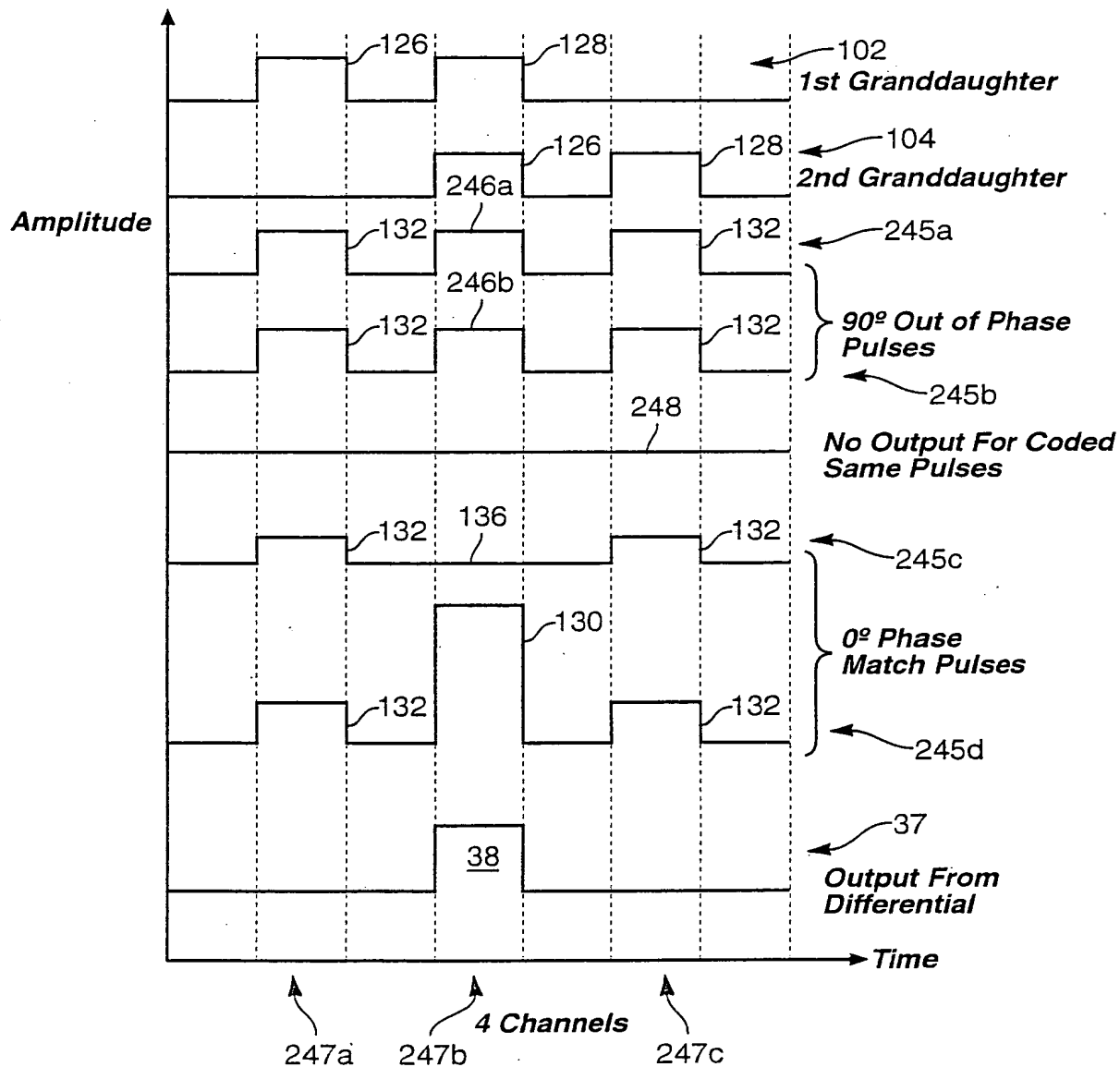


FIG. 36

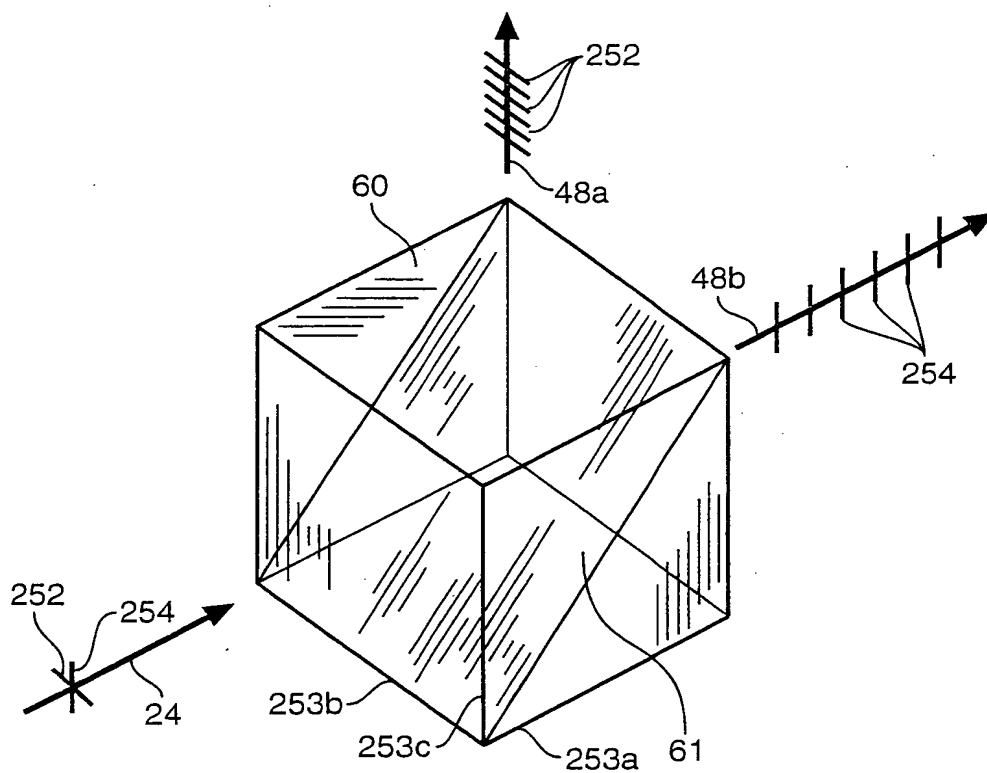


FIG. 37A

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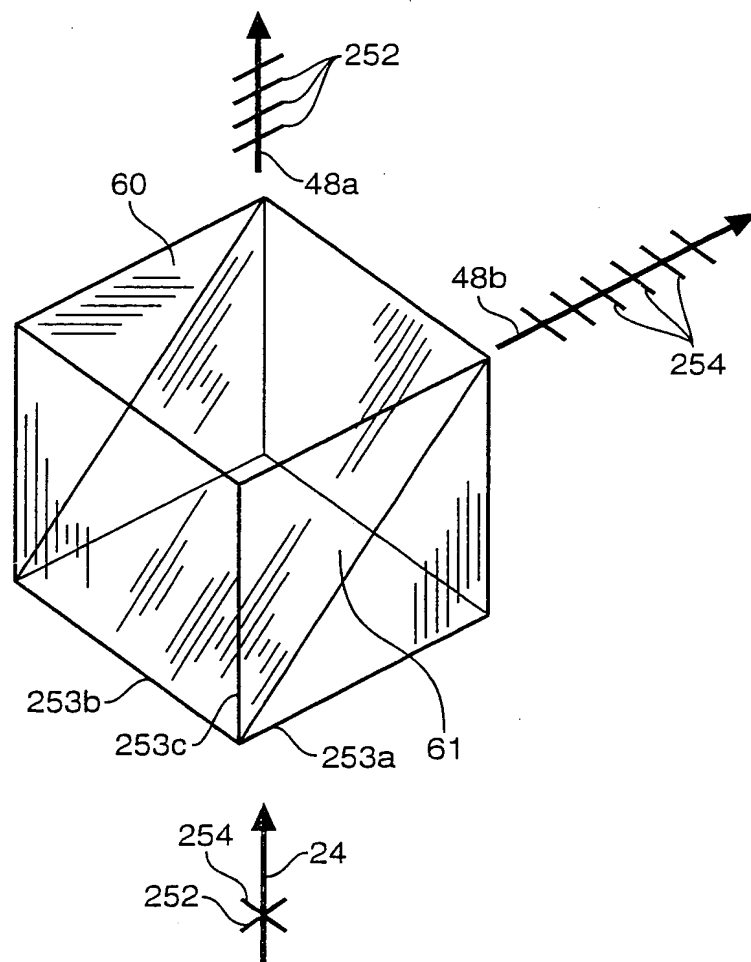
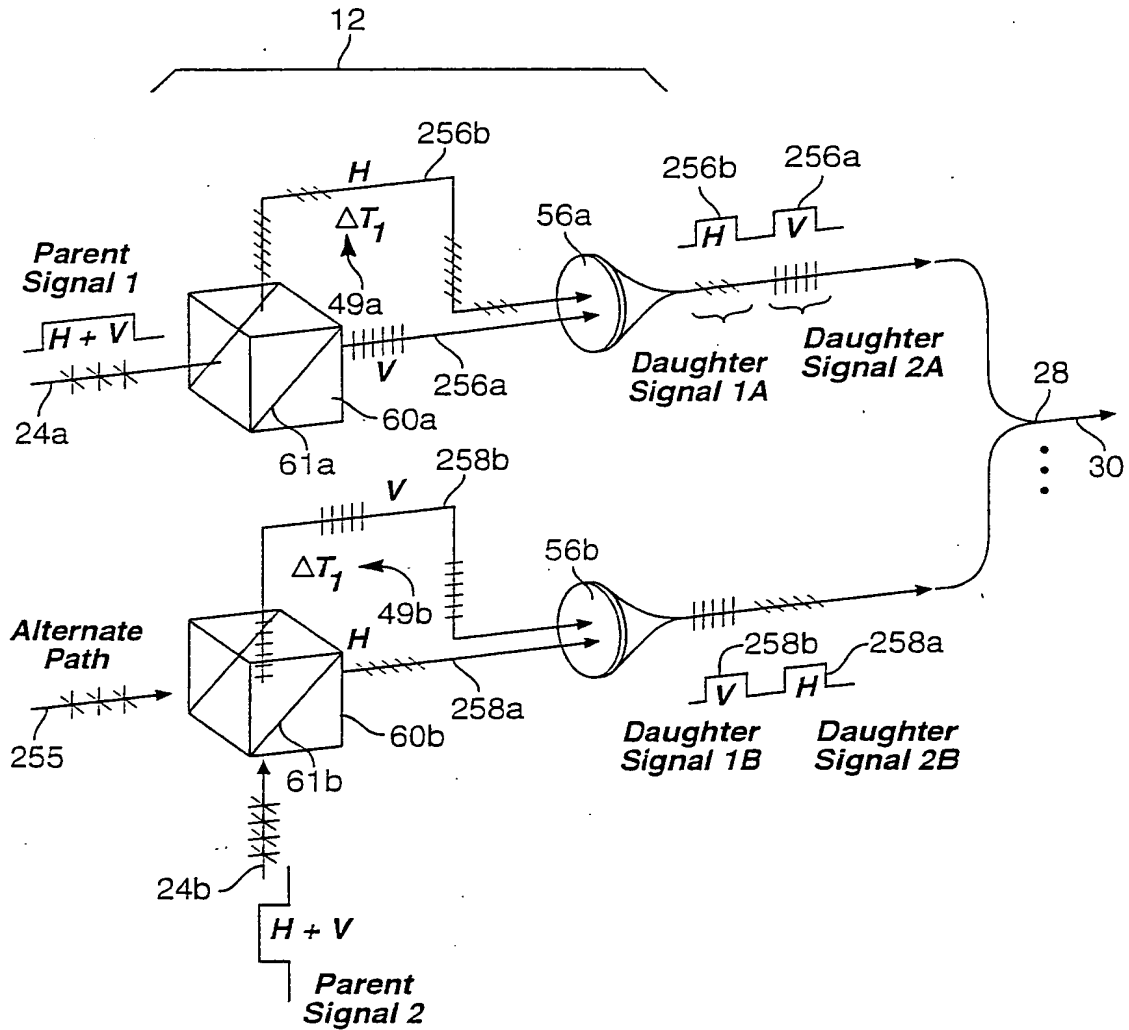


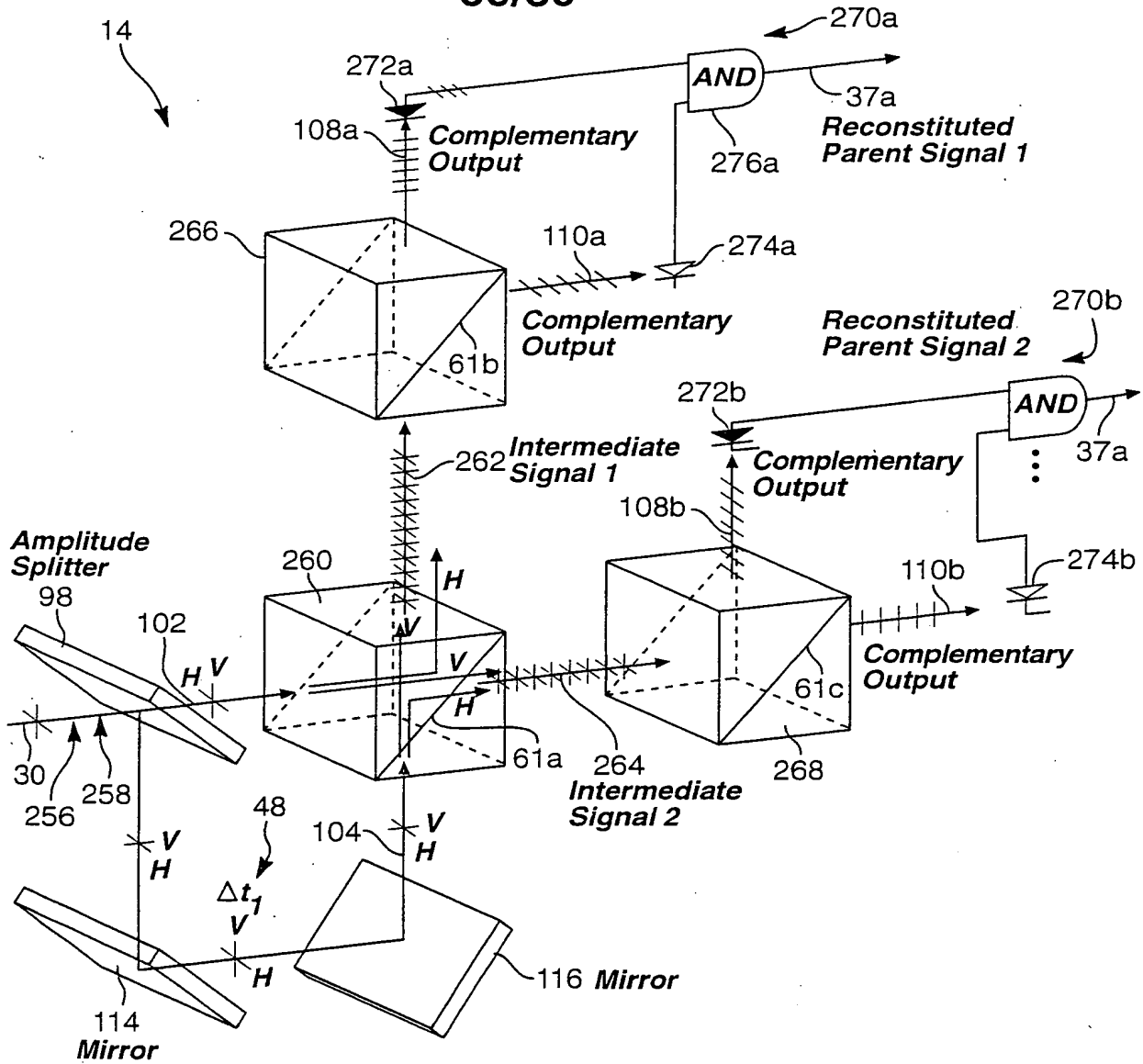
FIG. 37B



**Double Encoder With Polarizations Sequenced to Differentiate 2 Channels Having the Same Time Delay Between Daughter Signals**

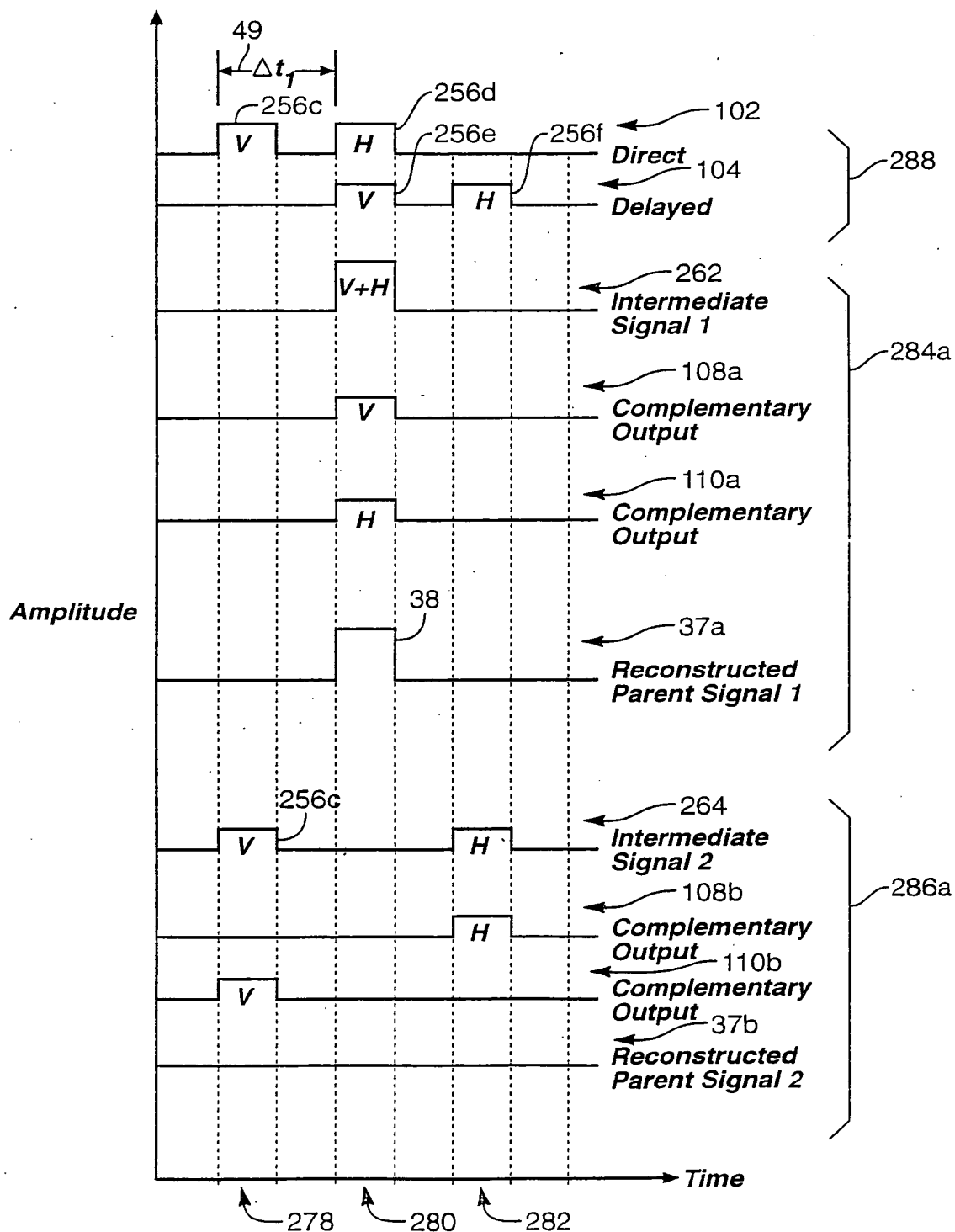
**FIG. 38**

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Double Decoder With Polarizations Sequenced to Differentiate 2 Channels Having the Same Time Delay Between Daughter Signals

FIG. 39



Polarization Sequenced Channel 1 Timing

FIG. 40



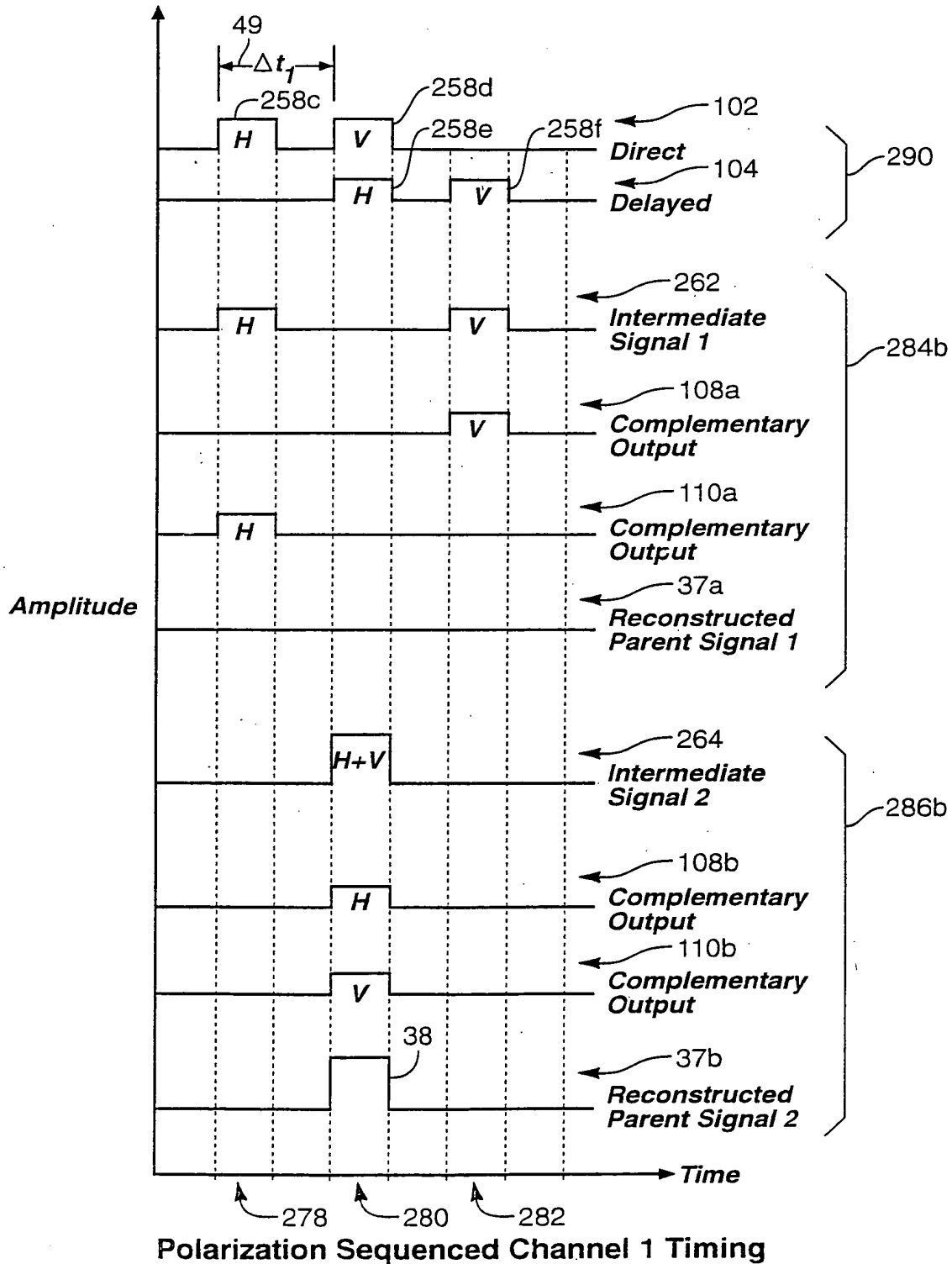


FIG. 41

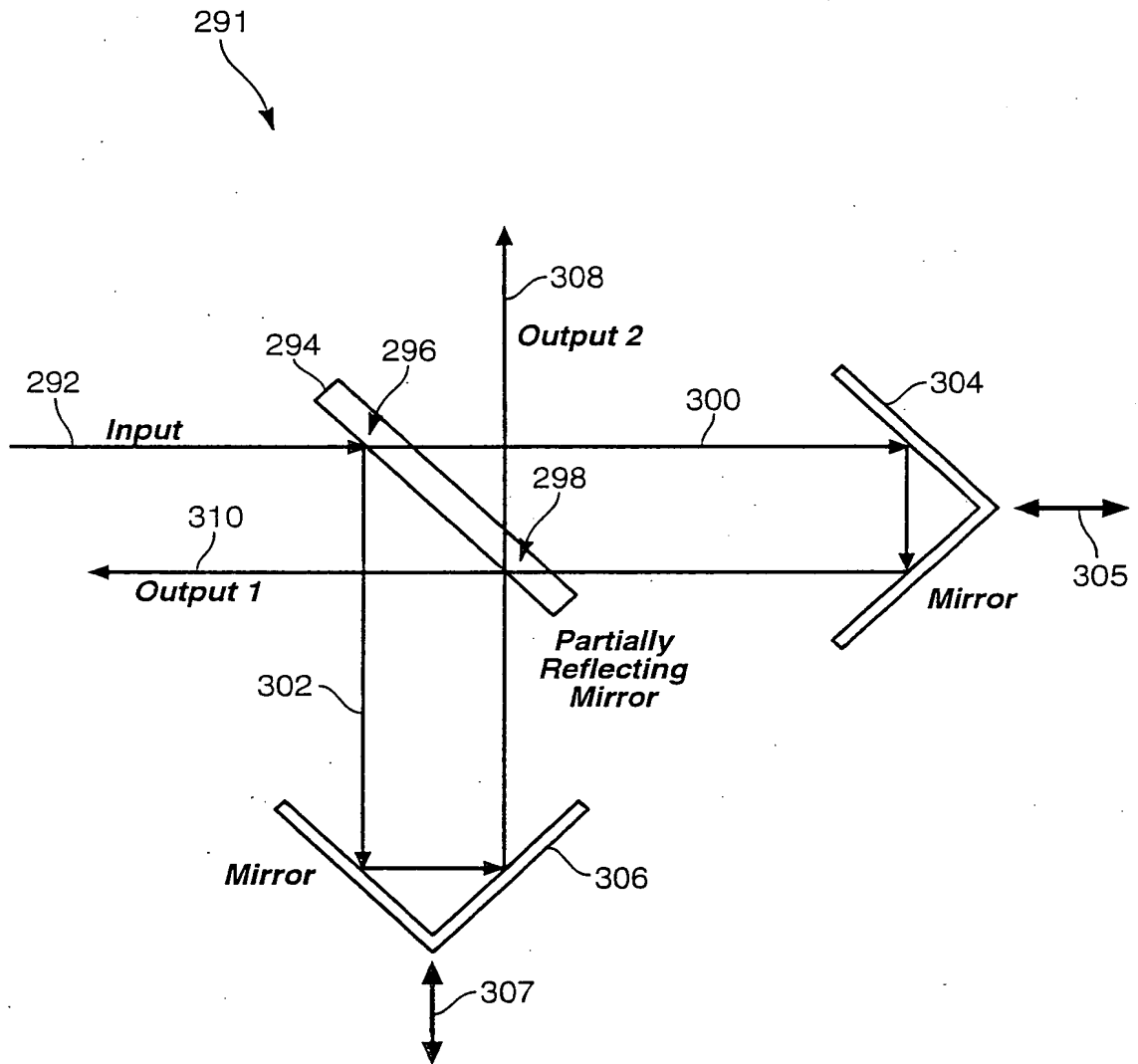


FIG. 42

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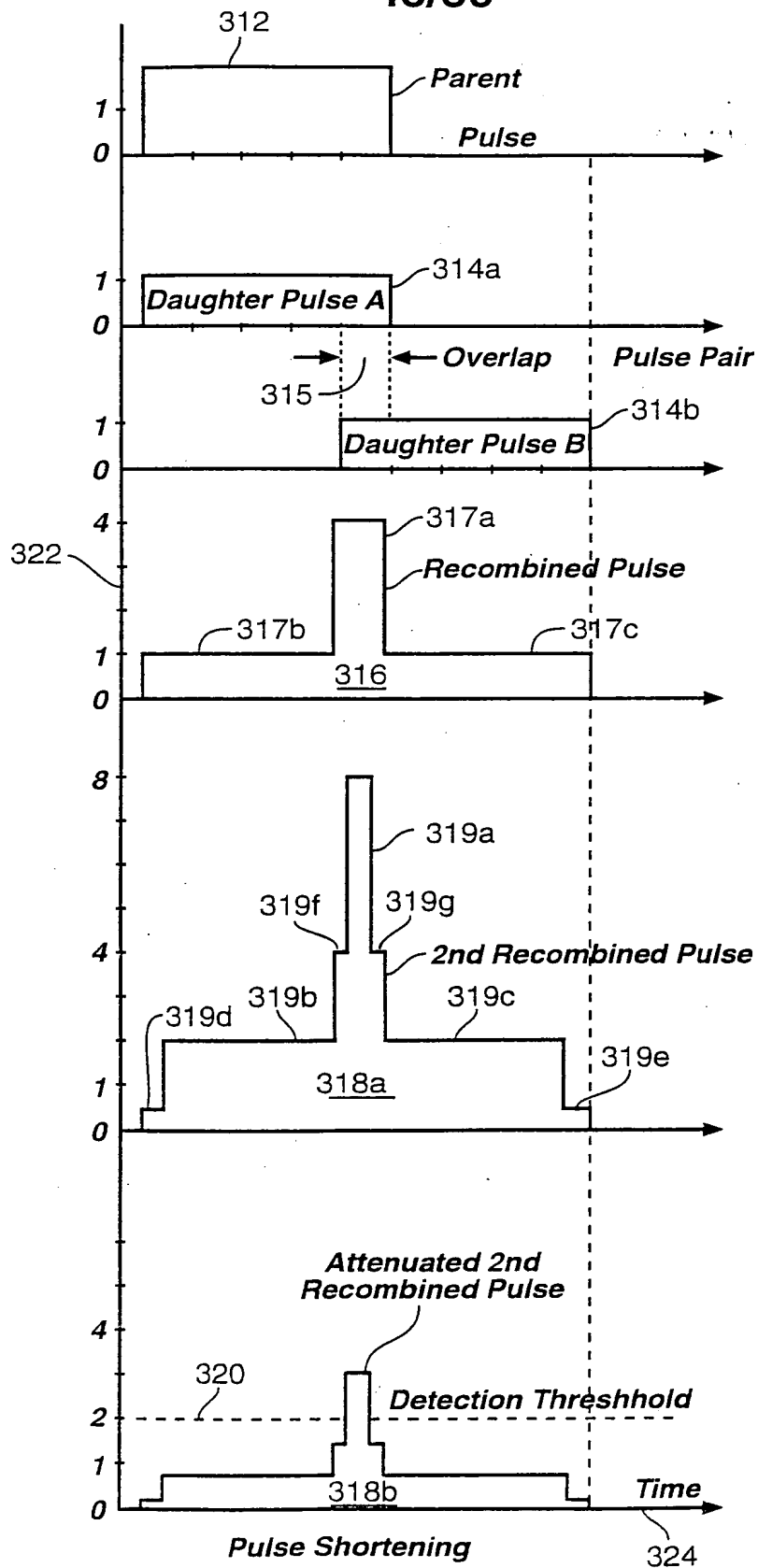


FIG. 43

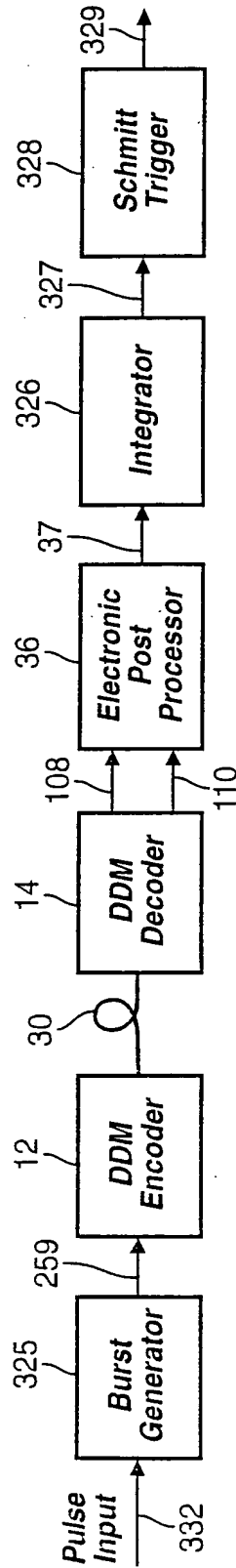


FIG. 44

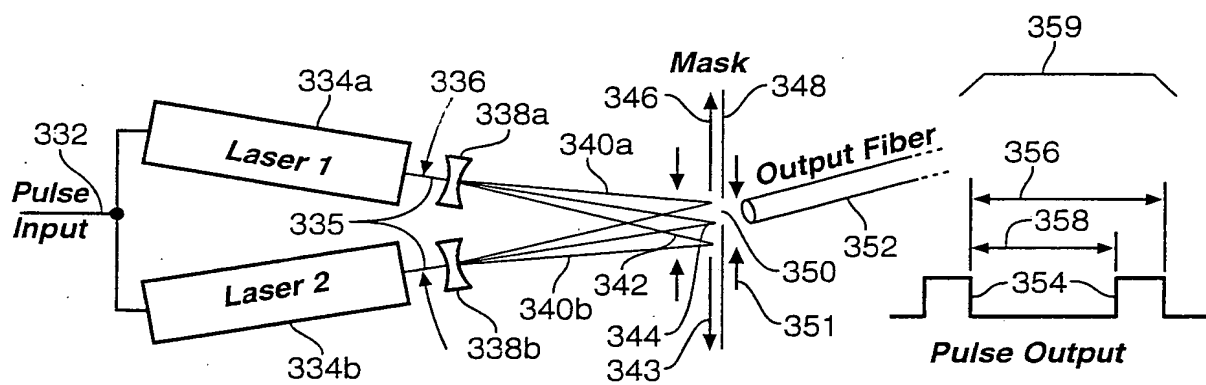
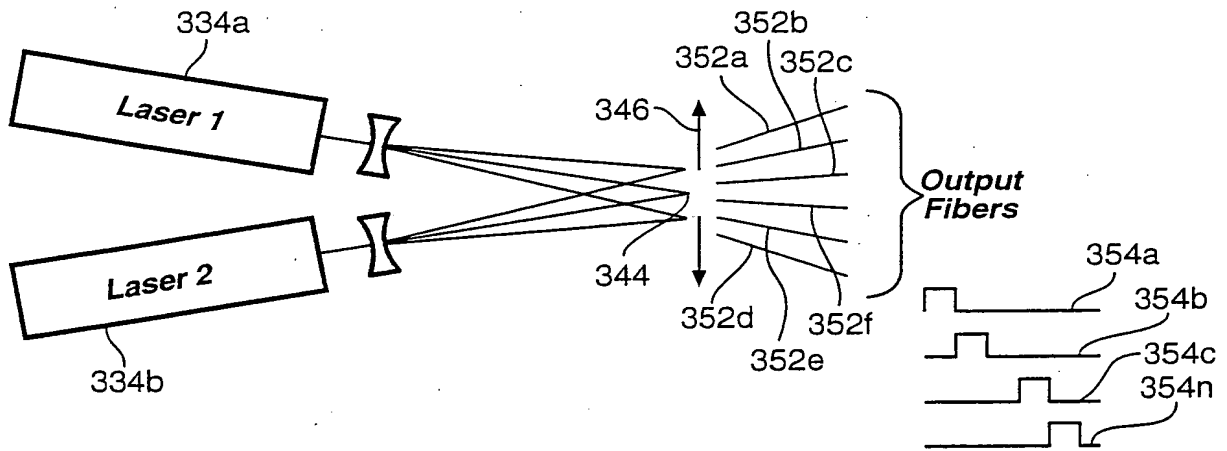


FIG. 45



**FIG. 46**

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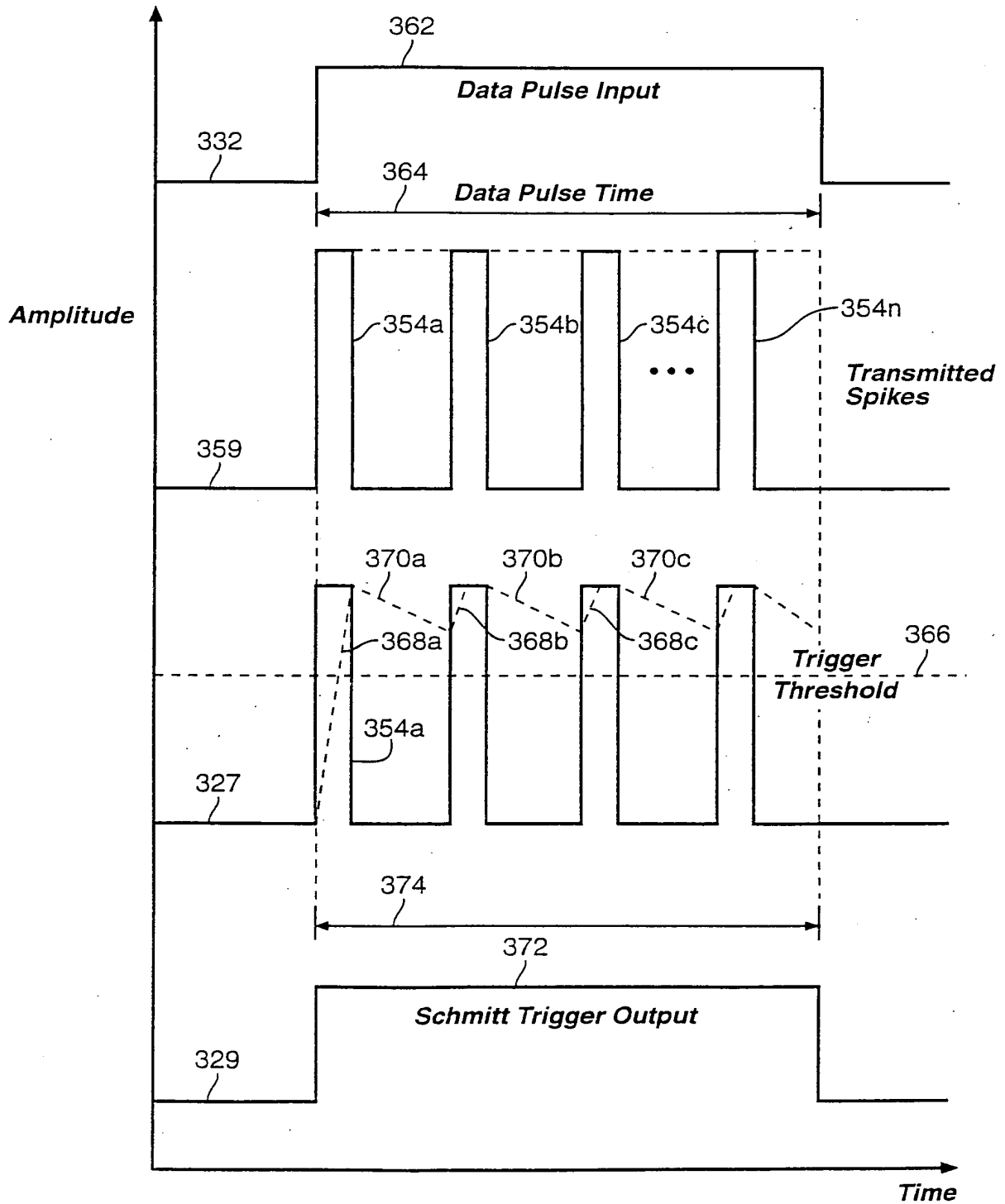


FIG. 47

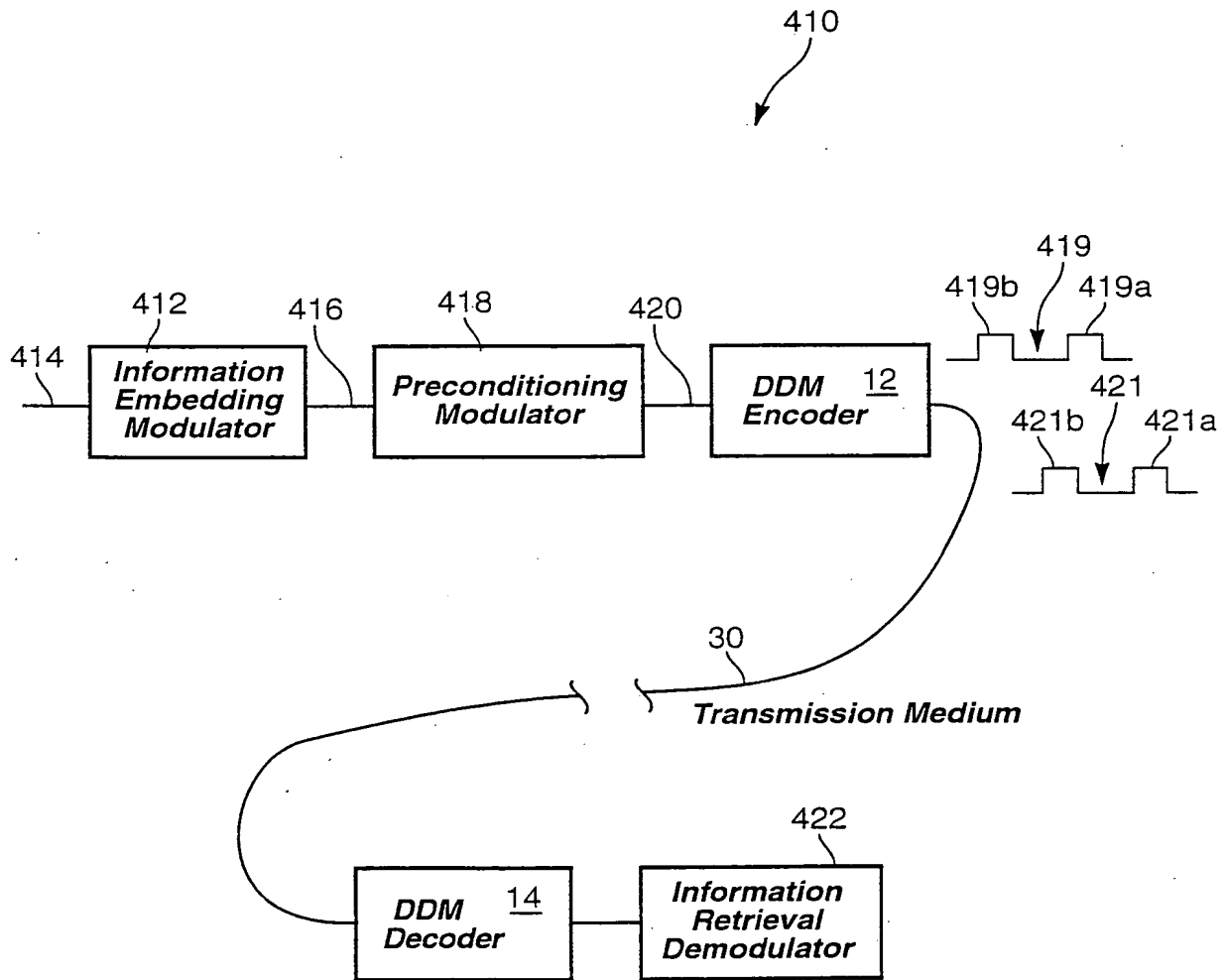


FIG. 48



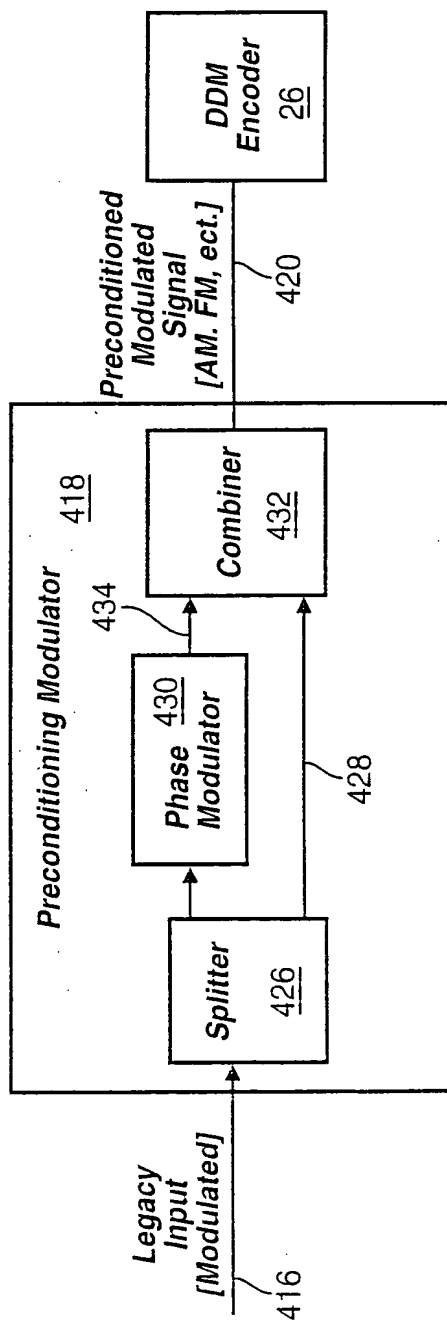


FIG. 49

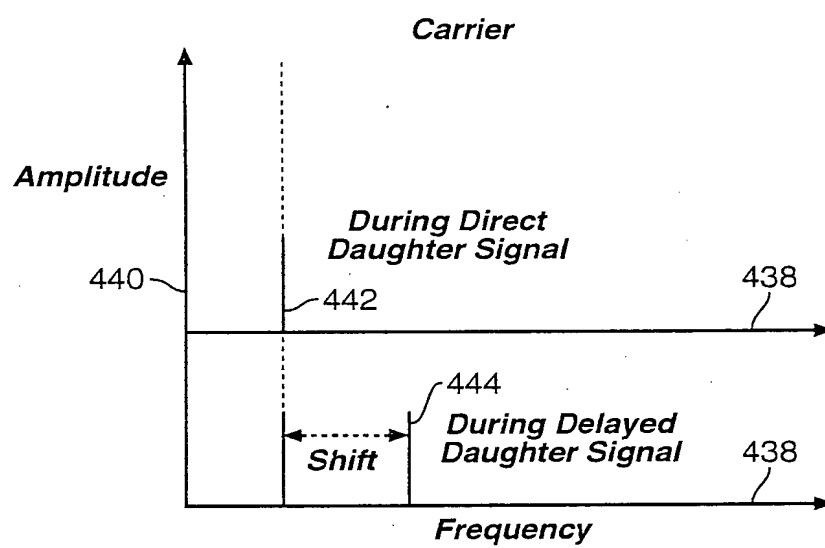


FIG. 50

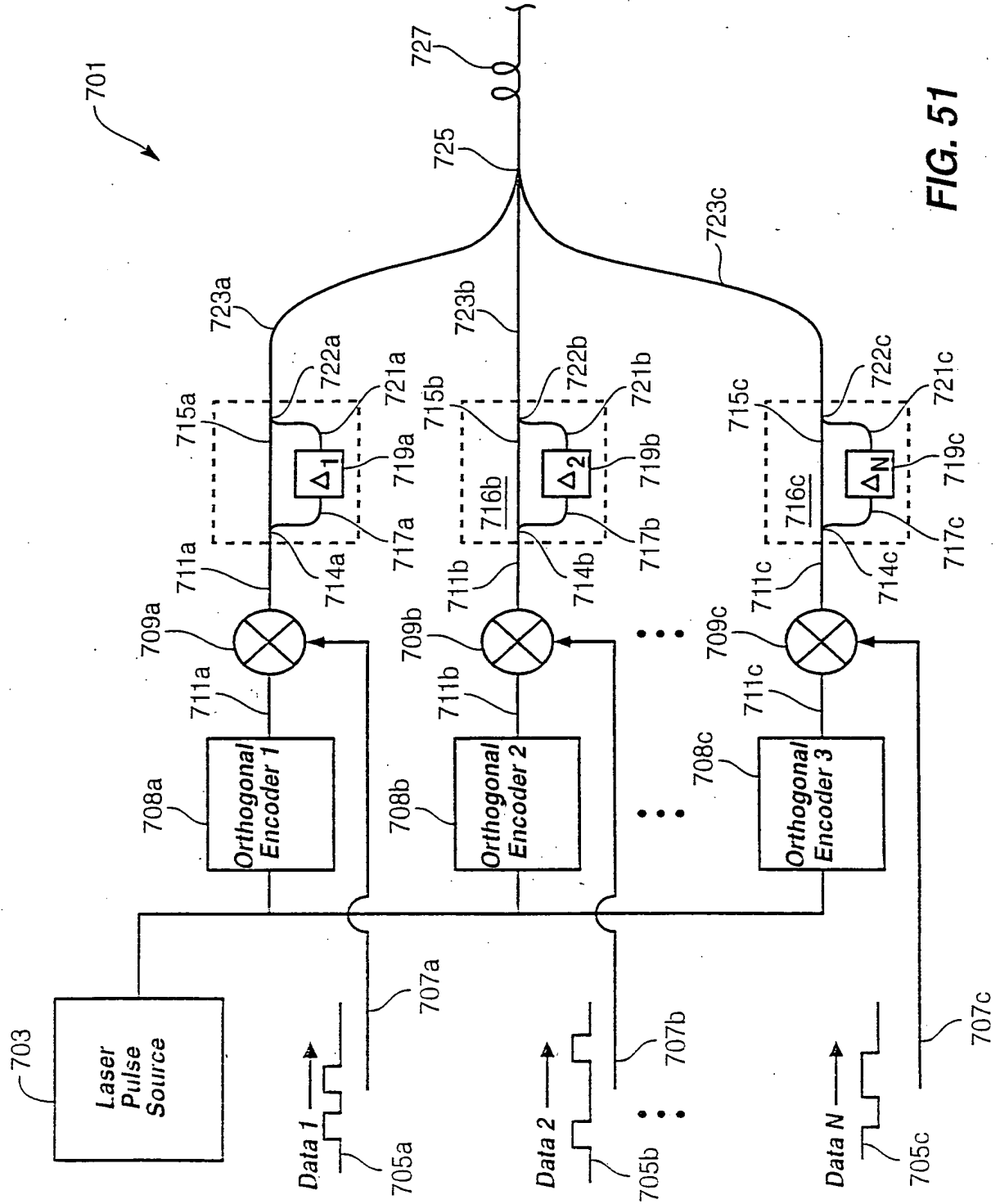


FIG. 51

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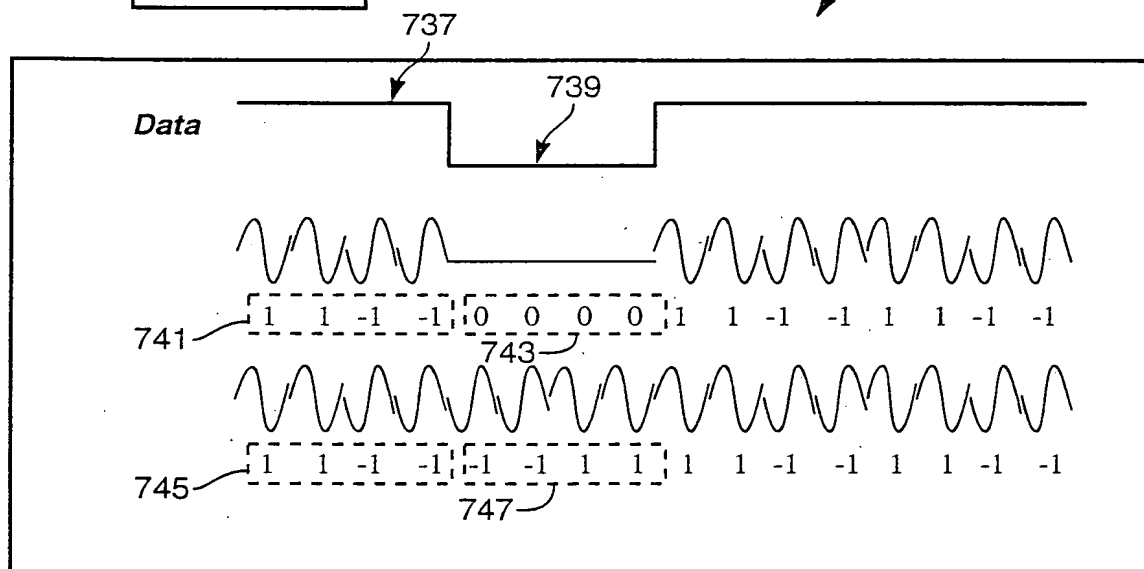
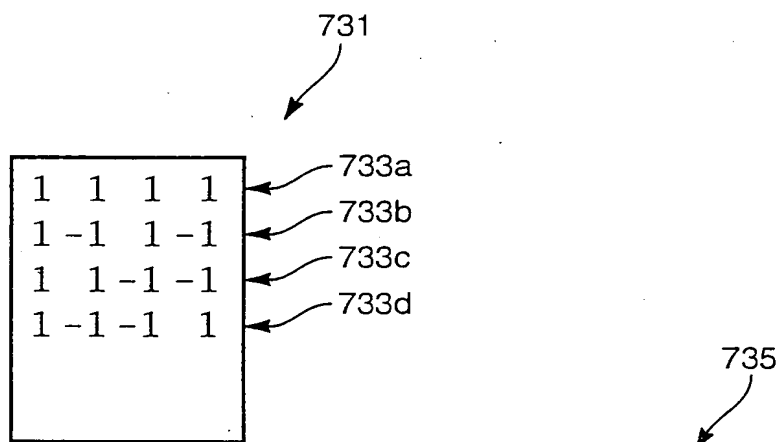


FIG. 52

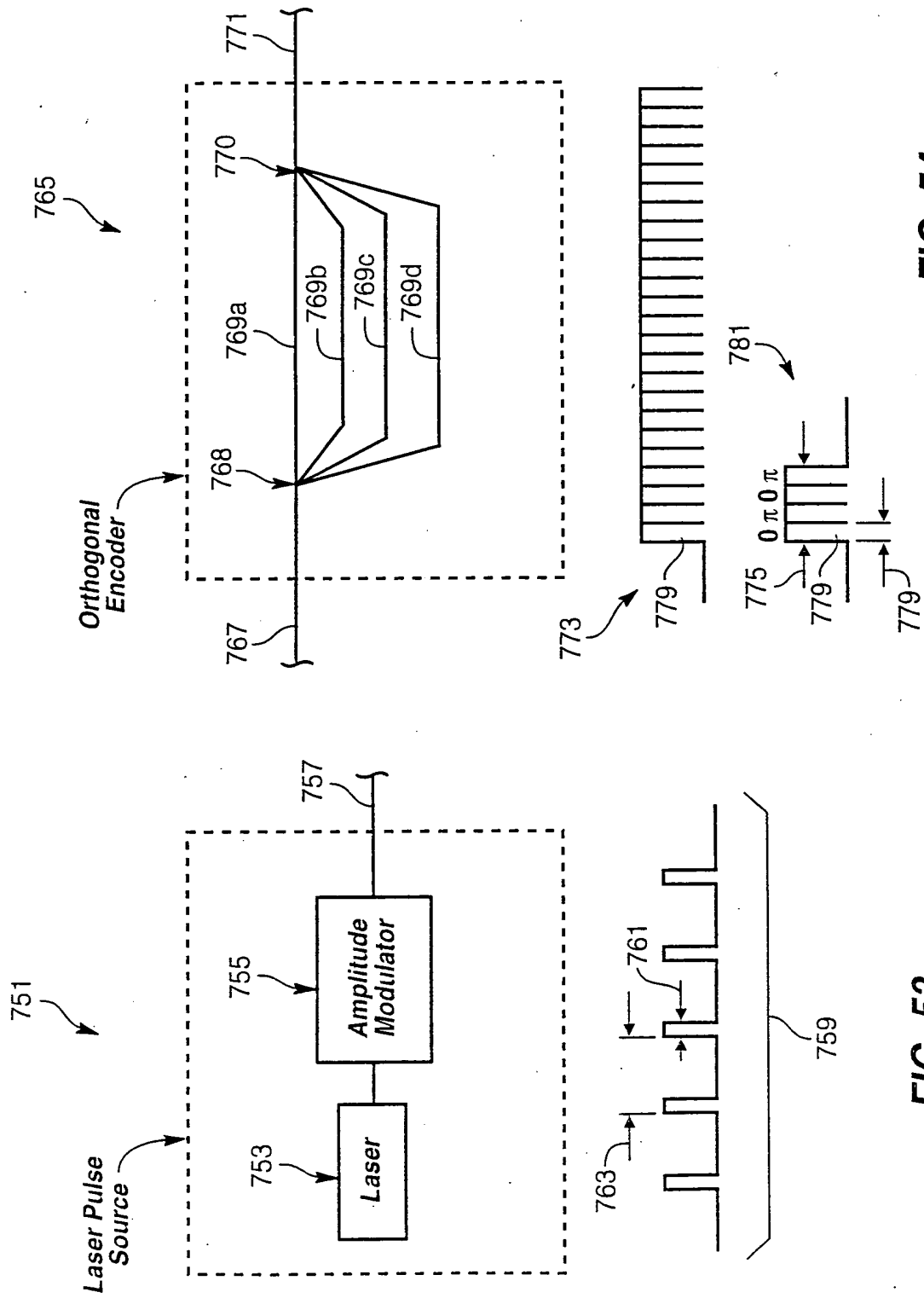
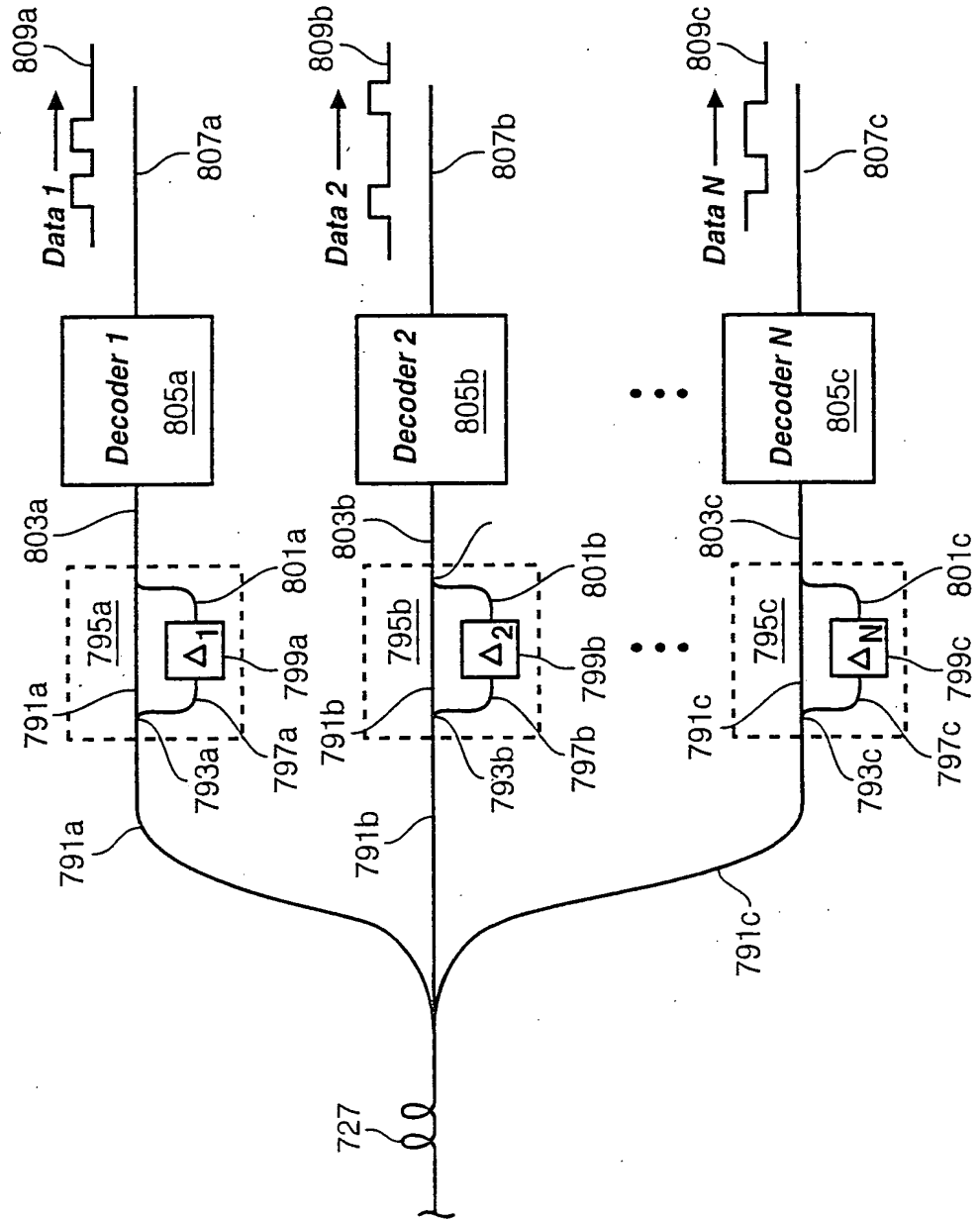
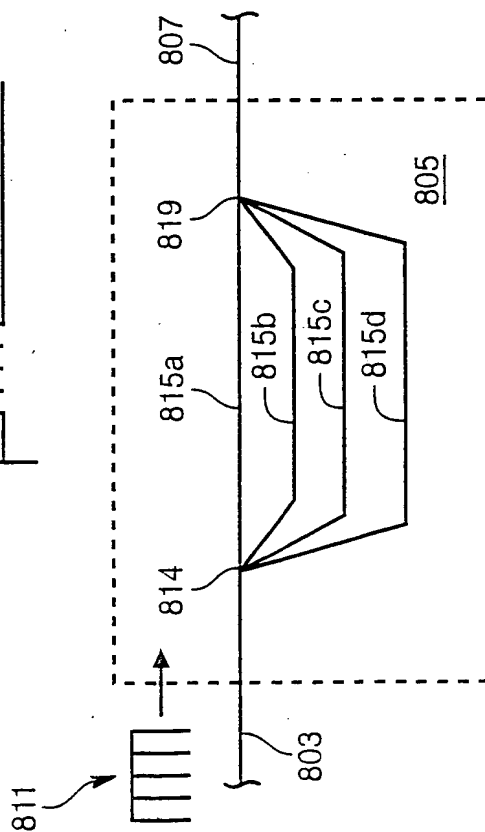
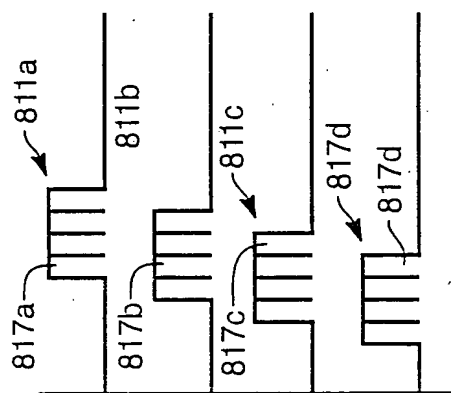


FIG. 54

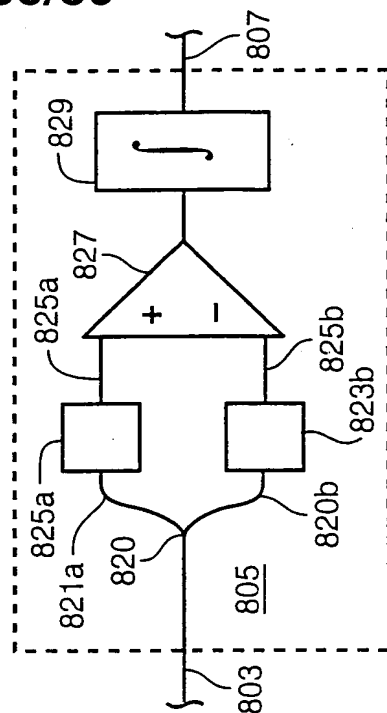
FIG. 53

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**FIG. 56**



**FIG. 57**

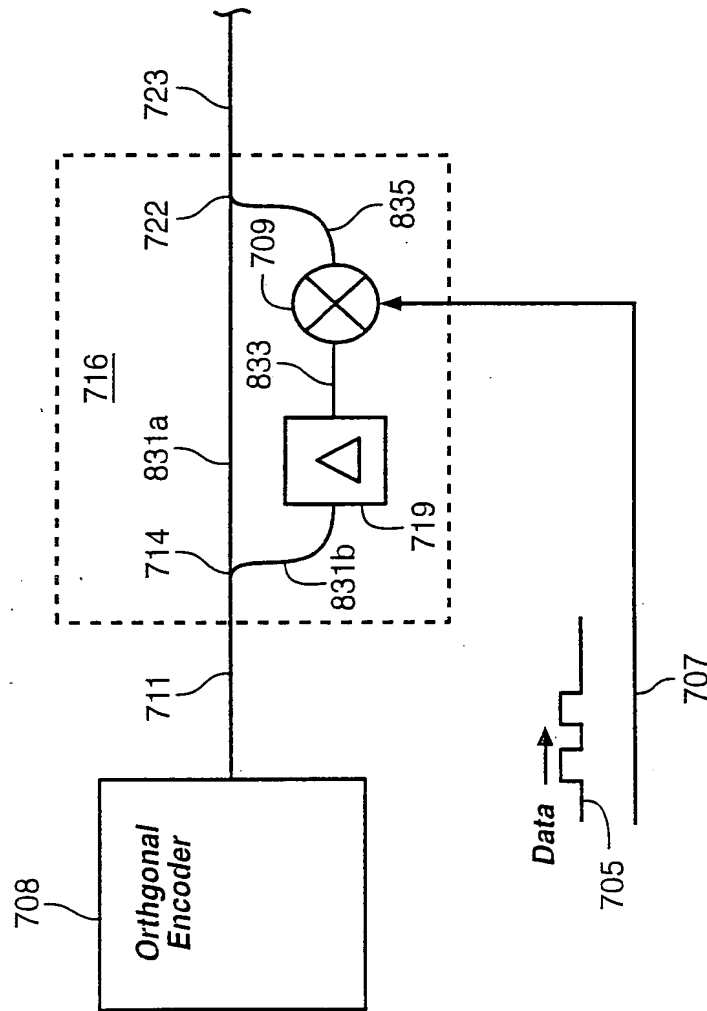


FIG. 58



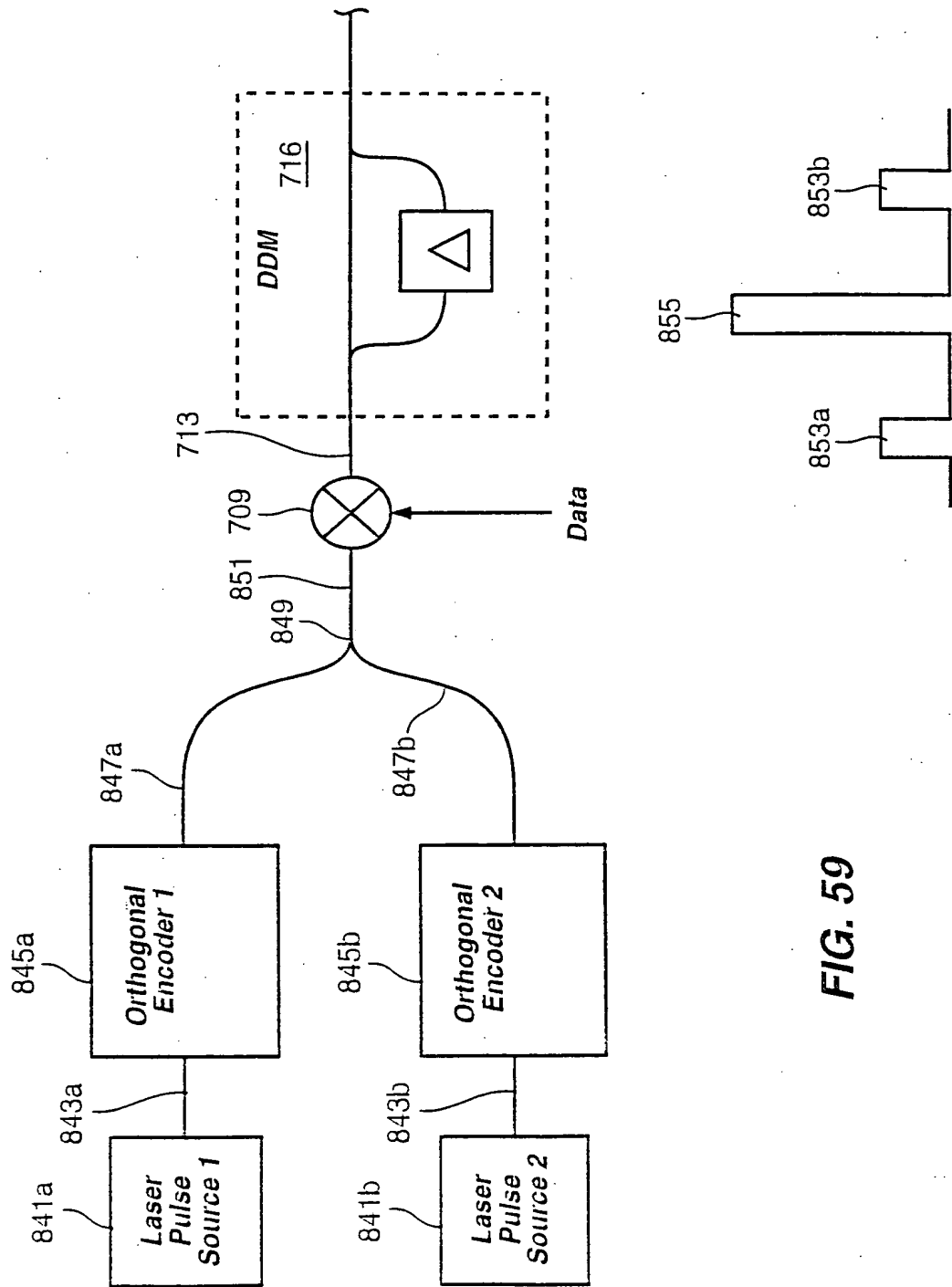


FIG. 59

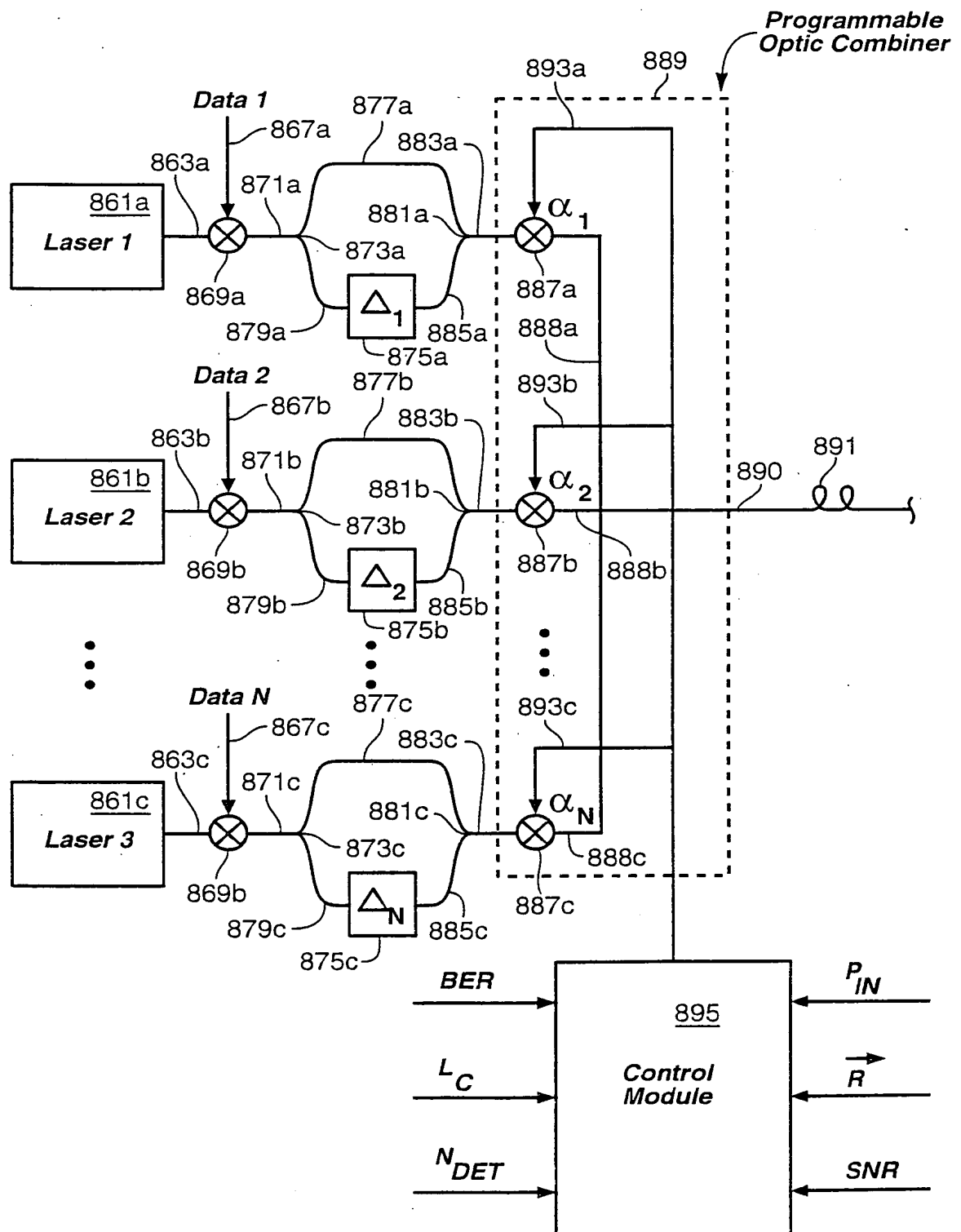


FIG. 60

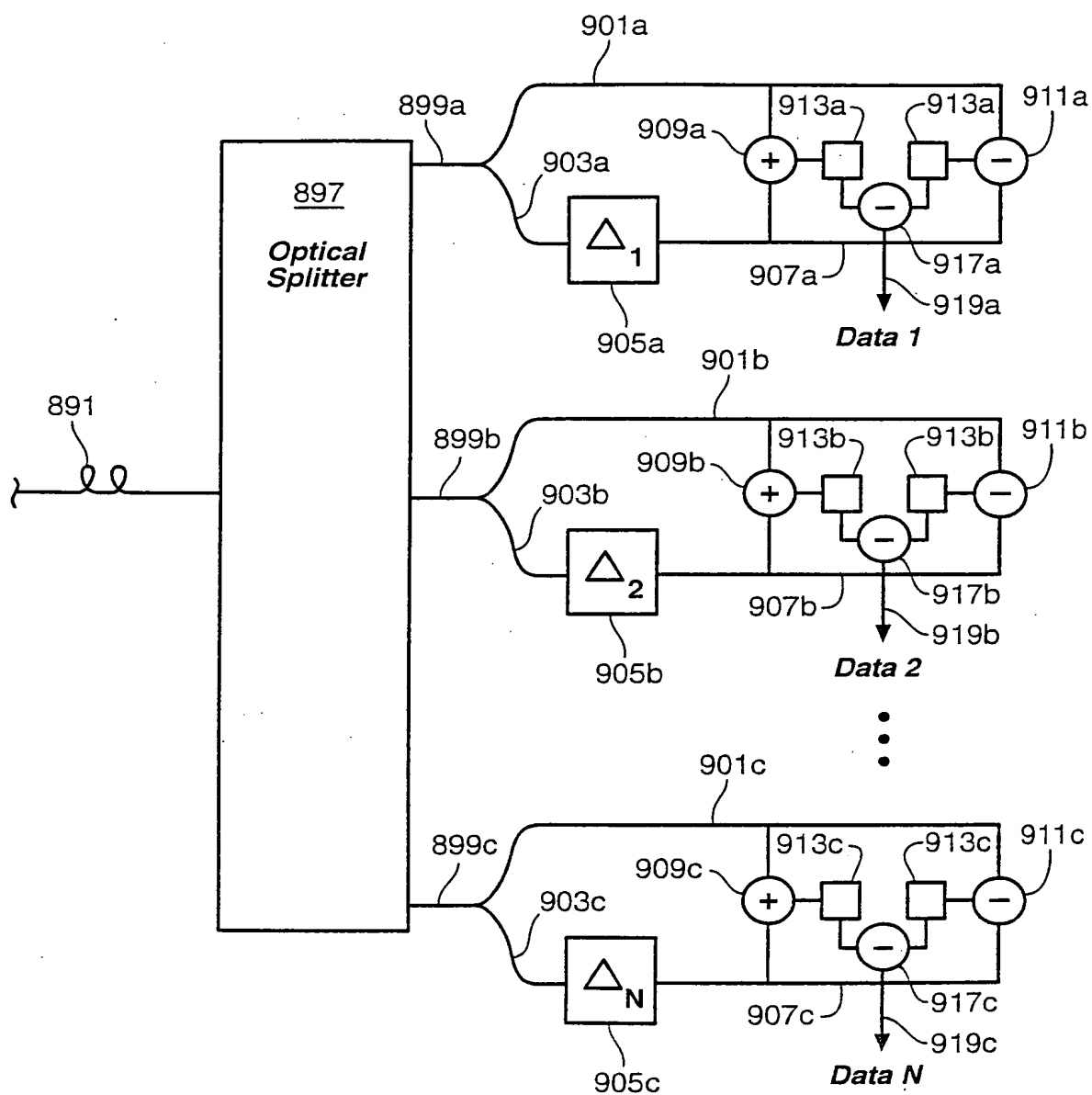


FIG. 61